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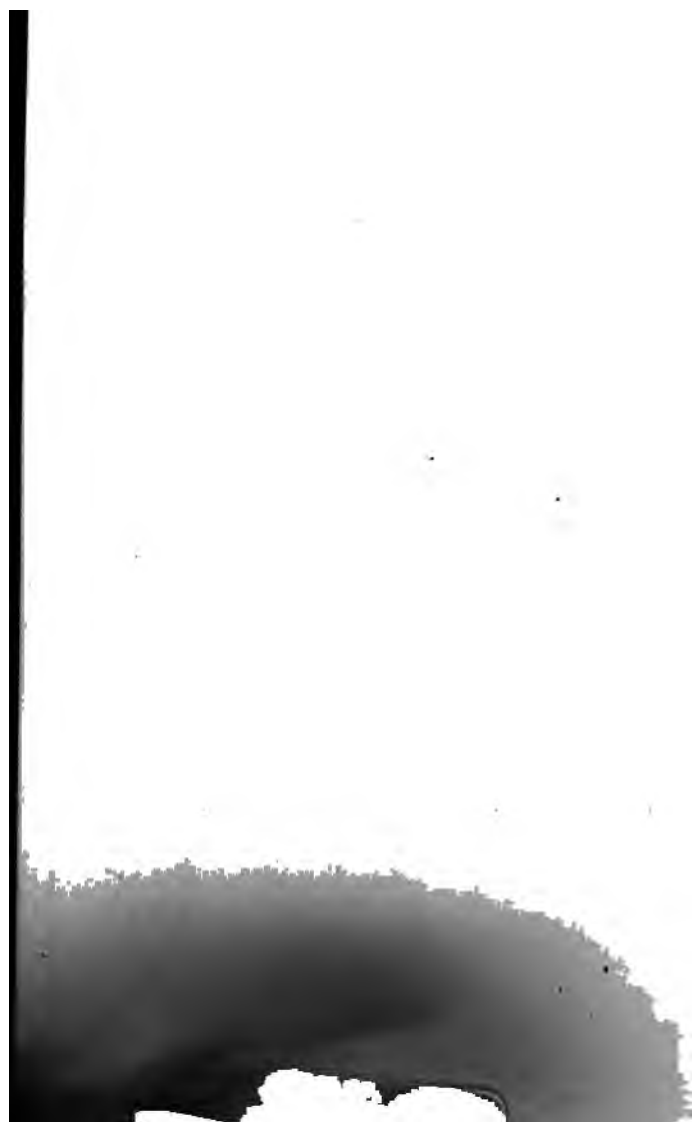
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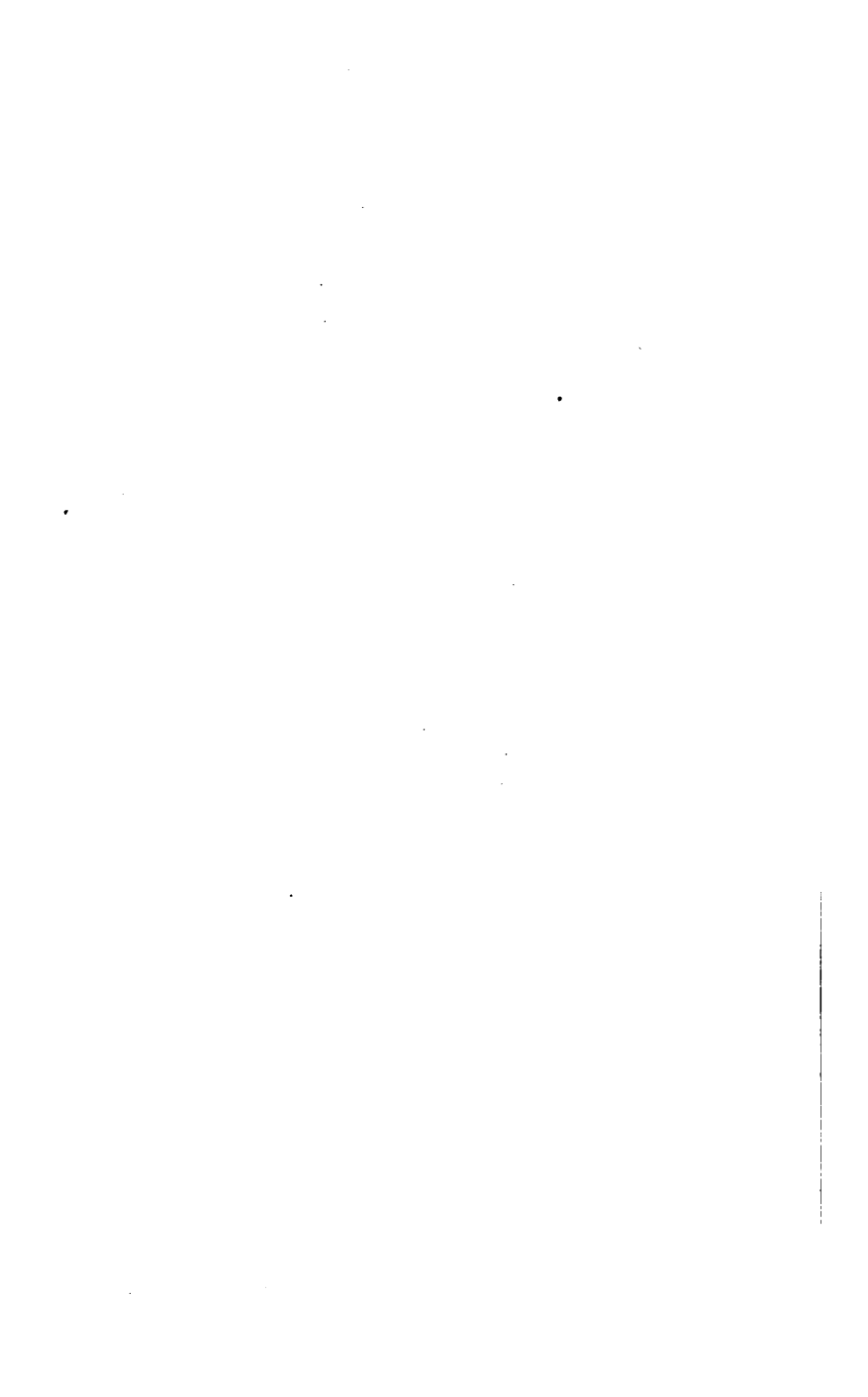
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THE  
CAUSES AND TREATMENT  
OF  
IMPERFECT DIGESTION.

BY  
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## ADVERTISEMENT.

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THE following pages contain the results of a long-continued attention to derangements of digestion. My aim has been to utilize such materials as I possessed, rather than to seek them elsewhere; in short, to write little which my own experience had not verified.

The great difficulty has been to write a short rather than a long book on so comprehensive a subject. The classification of the varieties of dyspepsia was adopted after much consideration, and I venture to hope will be found practically useful. To prevent unneces-

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# IMPERFECT DIGESTION,

ETC.

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## CHAPTER I.

### THE CAUSES OF DYSPEPSIA.

THE digestive power may be compared to the physical strength. Every individual can without inconvenience carry a certain weight, while any addition to it is accompanied by a proportionate sense of oppression. In the same way, what is called indigestion is often simply a result of excess. The amount of food which each man is capable of digesting with ease has always a limit. This limit is altogether relative, being strictly proportionate to his age, constitution, state of health, and habits.

For undisturbed digestion there are two

essential conditions: a proper relation of the aliment to the digestive organs, and a healthy state of the organs themselves. The first is generally within direct control; but obviously with the second, the case is different; and when, as frequently happens, both conditions are imperfectly fulfilled in the same person, more or less dyspepsia ensues.

Bearing in mind these general views, let us examine particular causes; and first, as regards the influence of age.

Appetite, or the natural desire for aliment, indicates that the waste of the body requires to be replenished—that the outlay begins to exceed the income.

From birth to the moment of dissolution, throughout the longest as well as the shortest life, waste and supply are in active operation. The rapid growth of the infant requires food at short intervals, and the energy of the process of waste as well as of repair is shown by the activity of the excreting organs. So long as growth continues, the same conditions, in a lessening degree, may be observed.

When the stature and form of the body are

matured, the demands for nutrition are less urgent, and, after middle age, this is still more the case. The practical inference is, that the man of advanced years does not require, and should not partake of, as much food as the young man.

How this instinct was recognised by a profound thinker, may be read in Cicero's "Essay on Old Age." He expresses himself gratefully, that while advancing years increased his desire for conversation, they had diminished the necessity for food and drink.\* Notwithstanding the boasted intelligence of modern times, such reflections are seldom made, and still more rarely acted upon.

At all stages of adult life, but particularly during its decline, the appetite is over-stimulated by condiments, and tempted to excess by culinary refinements.† Dyspepsia is not the

\* "*Habeo senectuti magnam gratiam, quæ mihi sermonis aviditatem auxit, potionis et cibi sustulit.*"

† Abernethy, in his peculiar style, insists that civilized man "eats and drinks an enormous deal more than is necessary for his wants or welfare. He fills his stomach and bowels with food which actually putrefies in those organs."

worst result of this. Gout, and still more serious maladies connected with an impure state of blood, closely follow.

Infringements of the laws of digestion are constantly and in many instances unconsciously committed. One man digests with ease an amount of food which would be fatal to the comfort of another. Animal food is easily digested by some persons twice, or even three times daily; while, if taken by others more than once, it is sure to induce suffering. Nevertheless, the diet of persons associated together is too often the same, and a sufficient individuality in matters of eating and drinking is seldom observed.

When the general health is impaired from any cause, digestion infallibly suffers. In many instances it is sought to prop up the one by 'overtaxing the powers of the other, and dyspepsia is often thus permanently added to the old disorder.

The proverb "custom is second nature," is to a great extent true of the human constitution. Health may be maintained, by gradual usage, under circumstances which would be

disastrous to the novice. In this country, great faults are committed in the relative amount and distribution of meals. Breakfast frequently consists of tea or coffee, with a small proportion of plain bread or toast. This allays the appetite, but is insufficient for the supply of bodily waste during the long interval between breakfast and a late dinner; during which, in many instances, no luncheon is taken. It also often happens that no solid food is partaken of from dinner-time until the following morning, which is an additional reason for a more substantial breakfast.

Experience shows that the delicate stomach suffers severely from these causes. In some instances, the long unemployed organ secretes an excess of mucus, which greatly interferes with digestion.

A sufficient amount of food at breakfast has a direct influence on the digestion of dinner; to effect which, large quantities of gastric juice—a fluid charged with nitrogenous and other materials, must be suddenly extracted from the blood. No argument is needed to prove that the blood will be better fitted for these demands

upon it, if replenished by the absorption of a substantial breakfast. If gastric juice, insufficient in quantity or of bad quality, be supplied, the appetite for dinner exceeds the digestive power, and another material cause of dyspepsia arises. Long abstinence thus causes the amount of food taken at dinner to be relatively, as well as absolutely, in excess. When a sufficient quantity of nutriment has been taken in the morning, less will be requisite at a later period, and less will be desired.

The distribution of meals in point of time is by many regarded as quite unimportant. Dinner, as has been said, comes late, quickly followed by tea, and sometimes by supper also. This approximation of meals is pernicious, for the human stomach was unquestionably intended to have intervals of rest. The organ should be allowed to act on its contents *en masse*; to eat constantly like a ruminant animal is altogether unnatural. The health of any individual would break down, were even the proper amount of food taken in equally divided portions at very short and equal intervals of time.

Continual alteration of the time of meals is another great mistake. Every hour of the day for dinner, from one to eight, will sometimes be ranged through in the course of a single week. Such irregularities may long be endured by the robust stomach, but are very injurious to the weakened organ. In relation to time, all our functions are singularly influenced by habit.

Digestion, therefore, will be best performed at the period when the stomach, from habit, expects employment.

The kind and quality of food are essential considerations; and these subjects will be considered in detail under the head of Treatment. Adulteration of articles of diet is without doubt a cause of dyspepsia. An inferior description of meat or other article of diet may, in those unaccustomed to it, produce serious inconvenience; even the impurities of water are, in many instances, known to disorder digestion.

Man inhabits every part of the globe where external influences can be successfully resisted. Food is an important element in effecting this, and Nature has provided for it accordingly.

The colder the climate the more animal food and oily substances are requisite; the warmer, the more vegetable diet is suitable. The whale-blubber of the skin-clad Esquimaux, and the rice of the naked Negro, are not more necessities of locality than matters of choice. The same indications exist even within European limits. Thus, diet in England and in Italy is essentially different.

The effects of universal communication are nowhere more obvious than on the luxurious table. To furnish the refined *cuisine* all climates, both sea and land, are laid under contribution; and the stomach is expected to digest everything that is put into it. Huddling together such various products, and neglect of the relation between climate and food, are active causes of dyspepsia. The substantial dishes of this country accord badly with the thermometer at ninety degrees. Inflexibility in regulating the kind and quantity of food taken is the cause of a large proportion of the ill health amongst the English in India.

Under the head of the relation of food to the organs may be placed the effects of in-

sufficient mastication. It is a fruitful source of dyspepsia, and is more frequently the result of haste or carelessness, than inevitable from the state of the teeth. The great prevalence of dyspepsia in the United States has been attributed to the rapid and characteristic manner in which meals are there despatched. In some employments the insufficient time allowed for meals is, for the same reason, a cause of disturbed digestion, and too often gives rise to permanent disease.

Besides actual loss of teeth, soreness of them, or of the gums, sometimes attended by fetid secretions, greatly interferes with mastication. It is most important that solid food should be duly prepared, by chewing, for the action of the stomach; and it is also important that the starchy elements of food be sufficiently submitted to the action of pure saliva.

Influences which affect the digestive organs less directly, but no less injuriously, are numerous. It has been assumed by some that the conditions of civilization are incompatible with the highest degree of health. But there is every reason to believe that dyspepsia affects

all races. The Laplander is especially subject to water-brash; the Maories of New Zealand suffer much from dyspepsia; and the use of bitter substances to promote digestion is known to many savage tribes. The extremes of abstinence and repletion common with savages, their precarious mode of existence, their fits of complete indolence, followed by exhausting fatigue, must cause them a full share of digestive trouble.

The relative superiority in physical strength of civilized over savage nations has been sufficiently proved. Refined and settled habits are not *necessarily* attended by any physical disadvantages. But it is observable, that those who live in towns are most affected by dyspepsia. There the mental powers are too often overtasked; and the relation between mind and body, as well as their mutual reactions, disregarded or forgotten. Too large a share of the nervous energy, so necessary for digestion, is expended in mental toil or business anxieties.

In other cases, attention to the commonest physical wants is neglected in monotonous pur-

suits ; the appetite for food is disregarded until it no longer exists ; exercise is either not taken at all, or is fitful and unseasonable ; ventilation is neglected, and a close and polluted atmosphere is inhaled. Such is no overdrawn picture of the town life of vast numbers who suffer, more or less, from dyspepsia.

Two habits, smoking and taking snuff, require special notice as causes of dyspepsia. Excessive smoking produces a depressed condition of the system, and a great waste of saliva if the habit of spitting is encouraged. I have met some severe cases of dyspepsia clearly resulting from these causes. Some individuals are unable to acquire the habit of smoking even moderately. Deadly paleness, nausea, vomiting, intermittency of pulse, with great depression of the circulation, come on whenever it is attempted. But this incapacity is exceptional, and so universal is the desire for tobacco, that it seems as if some want of the system is supplied by its use.

Smoking has of late been attacked and defended with much zeal, and its adversaries have strongly urged that the practice is a potent

cause of dyspepsia. The late Sir Benjamin Brodie was a great enemy to tobacco. But as one of his biographers has observed, in this instance he appeared to have departed from the rule by which he was generally guided, to weigh impartially all the facts bearing on an argument. Other names of eminence might be cited in the ranks of those who are strong opponents of smoking.

On the other hand, tobacco stands in no want of facts nor of able advocates in its favour.

It has been proved beyond question, that where men have been exposed to the combined influences of cold and want of food, those who smoked displayed most endurance. Dr. Hammond states, that smoking in moderation, if the food be at the same time sufficient, increases the weight of the body.\* In a clever work on physiology, recently published, the author states that a cigar after dinner notably assists his digestion.† I am often told by patients

\* *Physiological Memoirs.* By W. Hammond, M.D. Philadelphia, 1863.

† *The Physiology of Common Life.* By G. H. Lewes, M.D.

that the sense of oppression felt after meals is relieved by smoking. The explanation depends on the strong sympathy which exists between the stomach and the salivary glands. One proof of this dependence is that sickness of stomach is commonly attended by salivation. It is, therefore, highly probable that when the salivary glands are stimulated by smoking, the gastric glands, in obedience to a sympathetic action, pour out their secretion more freely. But if a depressing effect on the nervous system is induced by smoking too much, digestion is certain to be impeded. On the whole, smoking is the cause of more harm than good to digestion. That kind of chronic nervous depression which belongs to hard and inveterate smokers is always accompanied by dyspepsia.

The effects of taking snuff are more insidious, as no warning is given by immediate bad consequences. Great snuff-takers are often sufferers in the stomach. In addition to the specific effects of tobacco, the continued stimulating and mechanical action of snuff on the mucous membrane of the nose is injurious.

Irritation is directly transmitted from the nasal surface to that of the stomach, with which it is continuous. Dry snuffs are more hurtful than moist, as they penetrate farther.

The difficulty of breaking off or even moderating this habit is well known, and the following plan, practised with success by an inveterate snuff-taker, is worth mention. Instead of pure snuff, he kept in his box a mixture in equal parts of snuff and powdered valerian root. His theory was, that the valerian repaired the ravages of the snuff upon his nerves, but the more probable explanation of the benefit is that he consumed very much less of the disagreeable compound.

Persons engaged in offices are exposed to a directly exciting cause. The stooping posture in which they write, mechanically interferes with the stomach's action. I have even traced well-marked dyspepsia to habitually sitting immediately after dinner, in a low arm-chair, so that the body was curved forwards and the stomach compressed. In some trades the pressure of certain implements upon the pit of the stomach, as in the case of curriers, bootmakers,

and weavers, produces severe dyspepsia. Many bad cases, attended with water-brash, occur amongst the weavers of Spitalfields.

Self-indulgent, luxurious habits, are highly injurious to healthy digestion; but on this threadbare subject it would be mere waste of time to enlarge. Idleness, and the want of a definite pursuit in life, must also rank high in this class of causes. To preserve the general health, occupation is as necessary for the active mind, as exercise is for the vigorous body.

The importance in the system of the reproductive functions is such, that their exhaustion must, sooner or later, react on the functions of nutrition. Lamentable instances of the results of sexual excess are occasionally met, and dyspepsia is almost invariably one. But the injurious effects of a free indulgence of the sexual instincts have been highly coloured. Unprincipled men, who prey on the young and the inexperienced, not only magnify certain ailments, but distort their significance.

In youth the sensations are quickest, and the impressions most fresh and vivid; so that it might be supposed life would be always

then most keenly enjoyed. But its earlier years are frequently clouded. An aching desire for change and excitement often destroys present happiness; and when the desired excitement is unattainable, *ennui* and apparently hopeless indolence ensue. Experience convinces me that this condition of mind is the frequent result of a feeble state of health. This can be often traced to an overstrain of the mental powers — a strain daily increased amongst men by the spirit of emulation fostered and rewarded by the competitive system to an extent formerly unknown. Accomplishments amongst young girls are made objects of relentless perseverance. In both sexes, at a time when growth is incomplete, and new functions are springing into existence, the mental are developed at the expense of the bodily powers. Nutrition suffers because appetite and digestion are impaired, and the power of the mind itself is weakened. No reasonable doubt can be entertained that *thinking* is the result of a physical action in the brain, for over-exertion of mind fatigues equally with that of body. In what may be

for convenience termed secretion of thought, demands are made on nutrition just as in bodily exercise. It has been often observed that great *thinkers*, if healthy, are usually large *eaters*.

The state of the air we breathe is highly important in relation to dyspepsia. We live at the bottom of an elastic medium, everywhere presenting the same general composition, and exactly adapted to the exigencies of animal life. Any accidental impurity of the atmosphere tends to disturb the balance of health. Oxygenation of blood is the object of respiration; and its replenishment is the object of digestion. On the integrity of this blood depends the perfection of the digestive secretions, as well as the nervous energy by which they are governed. Amongst the poor, ill-ventilated workshops and crowded sleeping-rooms; amongst the upper classes, the overheated and impure atmosphere of assemblies and public places of amusement, are constantly acting causes of dyspepsia.

Independent of chemical alterations in the atmosphere, many invalids are affected by

changes of weather. Even in the healthy, a general feeling of discomfort is caused by easterly winds ; and various disorders are greatly aggravated by them. Rheumatic patients are especially susceptible of the influences of damp or cold winds, and many dyspeptics are hardly less so ; an unusually dry atmosphere is equally injurious to others.

The quantity and kind of food required by the system are much influenced by season and temperature, and the agency of these in causing dyspepsia is therefore not to be disregarded. Some dyspeptics are always better in summer than in winter, others the reverse ; while a great many tell us they suffer more in spring than at any other season.

Our bodies are at all times pervaded by electricity, the condition of which often completely changes. The clear, serene atmosphere is usually charged with positive electricity, and this, by induction, causes our bodies, as well as the earth itself, to be negative. In wet or stormy weather the opposite of this state of things is usual ; the atmosphere is negative while our bodies are positive. We are unable

in health to detect these electrical changes ; but we might reasonably look for their effects when disease had rendered the body less capable of resisting external impressions. The probable effects of electricity in dyspepsia will be again referred to.

We have still to consider instances in which the food may be suitable, and the digestive organs healthy, yet dyspepsia may be induced by an immediate and accidental effect upon the organs, through the influence of the nerves.

There are certain sensations, of which nausea is a remarkable instance, not obviously assignable to any of the five senses ; and all these sensations seem capable of being excited by mental influence. We are all conscious that the stomach is a region of sympathy ; and here Van Helmont placed the seat of the soul itself. With the stomach, or with the bowels, easily confounded with it, various passions—as joy, sorrow, compassion, and indignation—have been in all times associated.

It is universally known that bad news received at or preceding a meal, will spoil the best appetite. A disagreeable mental impres-

sion sometimes even produces severe dyspepsia, with epigastric pain and sense of oppression, nausea, or vomiting. The intimate nervous connection between the stomach and the brain leaves us at no loss to explain this; and probably an arrest of the secretion of gastric juice is the immediate cause. It is for the same reason that dyspepsia is produced or aggravated by severe mental exertion immediately after meals.

Violent bodily exercise when the stomach is full, is a well-known cause of disturbed digestion: and in this case the disturbance seems mechanical. The motions of the stomach cannot be favourably carried on while its contents are tossed about by rapid movements of the body; for we know it is essential to the due solution of food that it should be all in turn brought into contact with the stomach's surface.

A cold bath after a full meal will frequently disturb digestion; and a hot bath either of water or air will do so with still more certainty.

Dyspepsia from warm and cold baths occurs, I think, in each case on the same principle, but

for opposite reasons. It has been proved from observations on Alexis St. Martin,\* that congestion of the stomach is most unfavourable to the secretion of gastric juice. Now, the shock of cold bathing produces congestion, by driving the blood from the surface to the viscera; on the other hand, a certain flow of blood to the stomach is equally indispensable, and *that* would be interfered with by the hot bath. Free blood-letting soon after a meal is commonly succeeded by vomiting, and this affords another example of the effect of sudden withdrawal of blood from the digestive organs.

Regarded as a symptom, dyspepsia has probably the widest range of any subject in the history of diseases. Hardly one is unattended by digestive disturbance, and some, as pulmonary consumption, are at times preceded by it. Early attention to the defects of nutrition would often avert a fatal issue. The gravest forms of dyspepsia are caused by organic changes in the alimentary tube itself, as cancer and ulceration; but the plan of this treatise includes only the functional derangements of

\* See Chapter ix.

digestion, and my observations will be chiefly directed to those of which the stomach is the seat. Even with this limitation, dyspepsia is the most frequent malady of civilized life; although, fortunately, not equally a cause of death. It cannot be affirmed that simple dyspepsia does not sometimes shorten life, by producing another disease, or even proving fatal of itself; yet it is certain that digestion may be performed with difficulty for many years without more serious results than proverbial suffering and discomfort.

## CHAPTER II.

### THE SYMPTOMS OF DYSPEPSIA.

THE symptoms of dyspepsia are extremely numerous, and many of them may easily be confounded with those of other diseases. This makes the diagnosis of dyspepsia both a matter of great moment and of much difficulty. The symptoms which are most important will be now described.

One of the most common and direct of all is an uneasiness in the region of the stomach, felt soon after taking food, and proportionate to its amount or nature. This uneasiness is variously described as fulness, tightness, weight or oppression—a feeling as if the stomach was not large enough for the meal, or as if there was something heavy in the organ, &c., probably more according to the fancy of the patient than from any intrinsic difference in

the sensations. But they always indicate a real defect. It is incorrect to assume, as is sometimes done, that the sensations depend exclusively upon delay in the reduction of solid food to chyme, although this is often the case. The same symptoms frequently occur after liquid food; and I have known them produced in certain cases by simple water.

Flatulency, or gaseous distension of the stomach and bowels, is another common and very troublesome symptom. As gases are always present in the stomach, flatulency is in one sense simply an exaggeration of a natural condition. One source, and probably the only healthy source of gases in the stomach, is swallowed air. This gradually loses oxygen until, in the small intestine, the atmospheric proportions are greatly altered. Nitrogen, therefore, seems the chief distending medium which mechanically aids digestion; by incorporating with the fæces, it facilitates their transit through the intestines.\* But carbonic acid produced by fermentation is the chief cause of flatulence.

\* See Chapter ix. and Appendix B.

The semi-vital, semi-chemical process, digestion, is closely pressed upon by another process—fermentation. So closely does it follow, that any delay or fault in the solution of the alimentary mass, or any arrest of its proper rate of progress through the alimentary tube, constantly induces it. Here, then, we have a new gas-producing element. Now, too, we see that flatulence will be proportionate to fermentation, and fermentation to the hindrance of digestion. It has been proved by experiment, that during fermentation an apple will evolve a volume of gas six hundred times its own size. Some notion may be obtained from this of the amount of flatulence which may be caused by this process. It is difficult to say whether, even within the limits of natural digestion, some amount of gas may not be formed by fermentation; but I am inclined to regard it as foreign to the healthy organism.

I shall afterwards have occasion to mention that, under certain circumstances, an almost instantaneous gaseous distension of the stomach occurs in dyspepsia; a like kind of flatulence happens in hysteria, and then the bowels are

usually involved.\* From the suddenness with which flatus is produced in these cases, and the fact that the stomach is often empty at the time, it is plain that fermentation cannot be the cause. There is also evidence, derived from experiment, that the tasteless gas evolved consists mainly of nitrogen, which is not a product of fermentation.

Eructation, or the free discharge by the mouth of gas from the stomach, usually occurs voluntarily. In a smaller degree it is, however, often involuntary, and the gas is apt to be flavoured by some substance that happens to be in the stomach, as fish, onions, celery, cod-liver oil, &c. This is what is meant by patients when they tell us that what they eat "repeats itself." It is sometimes a source of great annoyance.

The derivation of nausea from *vaûs*, a ship, is sufficiently expressive. In sea-sickness, as in many other instances, nausea always precedes vomiting. In some cases of chronic vomiting, however, no nausea is experienced; and, on the other hand, nausea may be habitual, although

\* See Appendix B.

unaccompanied by vomiting. Debilitated persons, in whom digestion is weak, often suffer severely from nausea alone ; and in these cases, after nausea has subsided, the stomach often becomes suddenly distended with gas.

Vomiting is much oftener a result of accidental than of chronic dyspepsia, and when habitual, is generally caused by organic disease of the stomach. Opinions differ as to whether vomiting is mainly effected by contractions of the muscular fibres of the stomach. I am of opinion that such contractions do occur, and that retchings or ineffectual precursory efforts are due to obstinate closure of the cardiac orifice of the stomach, the natural condition of which is that of a door opening inwards with ease, but outwards with difficulty. Instances are recorded of persons possessing the power of vomiting at will.

When vomiting is much prolonged, nothing but bile and tenacious mucus are brought up. Bile is not natural to the stomach, but is introduced into it by extension of the action of vomiting to the upper part of the small intestine ; and this is evidence that vomiting is the

result of true contractions of the stomach. A certain quantity of mucus is natural to the empty stomach; but the irritation of vomiting induces an unusual flow of the secretion. In rare cases, however, mucus, by oppressing the stomach, is itself a cause of vomiting. Gastric catarrh, as such a flux of mucus is termed, is generally associated with the same affection of the mucous membrane elsewhere; thus, in chronic bronchitis, and in whooping-cough, a copious discharge of mucus from the stomach is common.

Allied to vomiting is regurgitation, usually an involuntary and feeble action, but one by which both fluids and solids, with or without gas, are raised from the stomach to the mouth. The mechanism consists in a reversal of the movements made by the gullet in swallowing; and this being extended to the lower end of the tube, small portions of the contents of the stomach are brought up.

Natural regurgitation occurs in the case of the cud-chewing animals, but instances are recorded of habitual cud-chewing in the human subject, and one has fallen under my own

notice. It happened in the person of a young man of much intelligence, who was troubled with dyspepsia; regurgitation was one of the symptoms, and it became at last considerably under control of his will. He discovered that, however disgusting, the best mode of avoiding further digestive suffering was to re-chew the food when raised into the mouth. On swallowing this, another portion was transmitted from the stomach, and thus the process commenced soon after a meal was considerably prolonged.

Pyrosis, or water-brash, sometimes exists without other symptoms, on which account Dr. Cullen described it as a distinct affection. In this form it is most prevalent in the spring season, and occasionally appears as an epidemic. The poorer classes are most affected by it. Cold climates, certain kinds of food—as, in Scotland, oaten diet—are exciting causes of pyrosis. Constant irritation of the stomach by the indigestible parts of the grain induces it. In Ireland, even when potatoes were the almost exclusive food of the peasantry, the same prevalence of pyrosis was not observed.

Pyrosis too often indicates organic disease of the stomach.

Water-brash, in its mildest form, consists in the ejection from the mouth of a limpid, tasteless secretion. There is a distinct perception that it comes from the gullet, and a sense of constriction at the pit of the stomach precedes the discharge, which is followed by relief. The fluid varies in quantity from less than a mouthful to more than half a pint, and is often described by the patient as feeling perfectly cold in the mouth. Sometimes the secretion is neutral to test paper; at others alkaline or acid. In severe cases this fluid often possesses very irritating properties, and some describe it as even corroding the gullet and throat. The constriction in the stomach is accompanied by pain, which is increased by standing erect; relieved by stooping, and by pressure. It is, therefore, a common practice with patients to press the pit of the stomach strongly against the edge of a table or other hard body.

Water-brash occurs at all times, but most commonly when the stomach is empty. The fluid is derived from various sources: its

occasional acidity, and the fact that portions of half-digested food are seen in it, prove that the stomach sometimes contributes. Some patients are conscious of an increased flow of saliva during the attacks, and it has been suggested that certain glands situated in the lower portion of the gullet are the chief sources of the discharge. We must, however, suppose the cardiac orifice of the stomach to become unnaturally closed, or no such collection of fluid could be formed.

Another affection, heartburn, has been confounded by some authors with water-brash. The occasional acidity of the ejected fluid and its effects have been already mentioned; but heartburn without pyrosis is very common, while water-brash may be unattended by any sensation like true heartburn. In the popular meaning, it is a disagreeable and peculiar burning sensation along the entire gullet, often distinctly commencing in the cardiac portion of the stomach; and from this its name is derived. As a scientific term, cardialgia ought to be limited to this affection. I cannot agree in the opinion, that the sensation is the result of

spasm of the gullet. The sensation progresses from below upwards; but that can be explained by the passage of an acrid fluid from the stomach to the mouth, as well as by spasm. It is very generally affirmed that a small quantity—a drop or two—of fluid issues from the throat, and that a most disagreeable bitter and pungent taste is afterwards experienced. From my own experience I compare it with that of very rancid butter. This taste, and the circumstance that pastry and certain other articles which, more or less directly, yield butyric acid, are particularly apt to induce heartburn, show that acid to be its cause.\*

Pain is a constant, but not an invariable symptom of dyspepsia, and in some, otherwise severe cases, no pain is experienced.

Dyspeptic pain may be practically divided into centric, or that of which the intestinal tube itself is the seat; and eccentric, or that which affects parts more or less distant from it.

Pain at the pit of the stomach after meals is usually of a dull, aching character, and tenderness of the part is its usual accompaniment.

\* See Appendix A.

Flatulence has its peculiar pain : patients frequently speak of a "windy pain of the stomach."

There is a peculiarly severe form of pain of the empty stomach ; sometimes it is so insupportable that the patient swoons.

It is difficult to say whether cramps, like those of the limbs, ever occur in the stomach ; but pain bearing a close resemblance to that of cramp, certainly does. Gout seems especially capable of producing cramp-like pains of the stomach.

Even if it were possible, it would be tedious and unprofitable to enumerate all the vagaries of dyspeptic pains. Those which shoot from the stomach as a common centre towards the spinal column, the shoulders, or lower angles of the shoulder bones, are amongst the most usual. Pain in the region of the heart, and in various parts of the chest, is also frequent. Nor is it affirming too much to say that pain, caused by dyspepsia, occurs in all parts of the body.

The headache of dyspepsia is of every variety, from the dulllest and least defined to the most

acute pain. Its position is equally variable. Sometimes the whole mass of the brain seems racked with anguish; at others it is confined to the back or the front part of the head, to one or both eyeballs, or to the region of the ear; and in these cases the parts may feel sore on pressure. Great intolerance of light and noise is sometimes experienced, and increase of pain on stooping is peculiarly a feature of dyspeptic headache.

A practical division may be made of dyspeptic headache into that which occurs during, or very soon after digestion, and that which occurs after a considerable interval.

The first kind, often attended by nausea and other gastric symptoms, is manifestly connected with the state of the stomach itself. This form of headache is usually of a dull, confused character, and is sometimes accompanied by suffusion of the eyes, dimness of vision, a sense of general chilliness, and peculiar coldness of the feet. It rarely continues longer than a few hours.

We have an instance of the close nervous relations between the head and stomach in that

sharp brow pain which attacks some people after eating ices.

The second variety, the severer and sharper kind of headache, of which more is to be said hereafter, generally comes on the day following the meal which has caused it. From this relation of time, and because it is usually attended with tenderness over the track of the duodenum, it is highly probable that this form of headache is due to an unnatural condition of the upper part of the small intestine. In some cases, in which headache had been a prominent symptom, the duodenum alone presented morbid appearances on *post-mortem* examination.

A great variety of head sensations might be described as symptomatic of dyspepsia; but it is sometimes difficult to say whether these sensations are to be attributed primarily to the head or to the stomach.

A "swimming" or "lightness" in the head, dizziness or a sensation of motion while the body is still, and the same, with fear of falling or vertigo, are often experienced by the dyspeptic.

A burning sensation, generally referred to

the vertex, and sometimes described as confined to a spot just under the skull, is not uncommon.

Occasionally the sufferers describe a tightness of the whole skull, as if an iron cap were compressing it; and this sensation, they say, is worse than actual pain.

Some patients complain of a trembling sensation over the body, but especially in the region of the stomach, which comes on when digestion has somewhat progressed.

The skin generally suffers in severe dyspepsia. A dry, harsh state of the integument is usual when the gastric mucous membrane is in an irritable condition, while in other cases the skin is greasy, from an excess of sebaceous secretion. Eczematous and other eruptions are common dyspeptic results, of which I shall have to speak afterwards.

A medical man who would omit to examine the tongue in dyspepsia, would justly be thought negligent; yet the importance of the examination should not be overrated. A clean tongue—by which is understood a condition of sufficient moisture, its surface being of a natural red

colour—is one of the best indications we possess of a good state of the general health. In a word, this impressible organ is more an index of the general condition of the body than of the stomach in particular. Any febrile indisposition, by which the pulse is raised and the secretion of the skin interfered with, commonly affects the tongue. It may be objected that the tongue is then affected through the stomach; but in such cases we frequently find less direct evidence of gastric affection than we do of functional affections of other viscera. There are many persons, in all respects free from stomach disorder, in whom the tongue, especially on rising in the morning, is habitually foul. The habit of sleeping with the mouth open is often the cause. Exposure to air and the passage of the breath dries the tongue's epithelial covering, which takes the appearance of a brown coating. In fevers the same occurs in an exaggerated degree.

In general, nothing special can be arrived at by mere inspection of the tongue, but much may be learned from it in conjunction with other symptoms. Although the state of the

stomach may not be clearly indicated, the amount of evidence supplied may correctly guide our treatment. The sum of medical experience largely consists in the right appreciation of small but essential differences, too complicated or too minute for exact description in words.

The following are some well-marked morbid conditions of the tongue connected with dyspepsia. An unnaturally red condition of the organ is caused by deficiency in its epithelial coating, and indicates the same condition of the internal surface of the stomach. The redness is usually most marked at the tip; and when the papillæ situated there are prominent, its resemblance to a red strawberry is striking. As a symptom, no condition of the organ is more reliable than this. An irritable condition of the stomach, as farther proved by tenderness on pressure at the pit, loss of appetite, and thirst are generally associated with this strawberry-like tongue.

When the back part of the tongue is smeared with a creamy-white or yellowish coating, a foul state of the gastro-intestinal tube is indi-

cated, and alkalies, mild mercurials, and purgatives do good.

A brown tongue is more generally associated with dyspepsia from temporary excess than with the habitual disorder.

When the tongue is broad, flabby, and pale, it indicates an anæmic and debilitated condition of the whole system, accompanied by weakness of digestion. It is not often foul in these cases, but owing to loss of elasticity and increased width, indentations made by the teeth on its edges may be commonly observed. Preparations of iron and the mineral acids are then the best remedies.

Sometimes the large papillæ (*papillæ circumvallatæ*), from fifteen to twenty of which exist at the back of the tongue, become very turgid. They look like inflamed warts, and are usually associated with severe and long-existing dyspepsia.

A foul streak may be often observed along the middle part of the tongue's upper surface, while the edges are clean; or, *vice versâ*, the middle part is clean, while one edge is coated, or both edges are in that condition. No great

importance is to be attached to these variations. They can generally be accounted for by the mode in which the organ comes into contact with the mouth and its contents. Thus, when, owing to the state of the teeth, the patient is compelled to eat at one side, it is easy to point it out from inspection of the tongue alone; it is cleaner at that side than at the other. Island-like clean spots are sometimes seen in the midst of the coating: they are the seats of former ulcerations, or else patches of psoriasis, and are due to loss of the epithelial covering.

Fissures of the tongue are frequently dependent on digestive disturbance. These solutions of continuity are most common in dyspeptics of dissipated habits, and profuse bleeding is sometimes the consequence.

White patches of lymph or aphthæ, often beginning as minute pimples, are common to the mucous membrane of the mouth and to the tongue; their favourite seat is the sides and under parts of the organ, as seen when the tongue is protruded, or else on the inside of the mouth, near the junction of the lips. After

some days, the patches attain their full size, and then disappear, often leaving troublesome ulcers in their place. According to my observation, aphthæ generally indicate acidity, and the gouty tendency. That fatal disease, chiefly occurring in hot countries, of which an aphthous condition of the digestive tube is the leading symptom, is not included in the present consideration.

The throat is often affected in dyspepsia, and attention is commonly drawn to it by complaints of a slight soreness or stiffness, as if the mobility of the parts was impaired. On inspection, a turgid state of its vessels is generally observed; and the space between the tonsils occupied by tenacious mucus, which the patient fruitlessly endeavours to expel. Another condition of the throat may often be noticed: it is dotted over by small pimple-like elevations of the mucous membrane. Relaxation of the uvula is constantly associated with these conditions.

Certain symptoms connected with the sense of taste deserve notice. They are connected with the state of the saliva, and the latter is probably always affected secondarily when the

stomach is disordered. It is even possible that certain forms of dyspepsia may be due to defects of the saliva, of which we as yet possess no exact knowledge.

A sour taste is the most common of these symptoms, and its gastric connection is so marked, that a *sour stomach* is the popular phrase for it; in such cases, the saliva when tested is often found to be acid, a state of the secretion most destructive to the teeth. A bitter taste is not uncommon, and is generally associated with constipation. Occasionally, we hear a sweet taste complained of, and this is usually accompanied by an increased secretion of saliva. It is symptomatic of stomach disorder, but its particular indications are not clear. It seems to have no connection with diabetes; for although a saccharine smell of the breath is usual in this disease, sweetness of the saliva is not common, nor is sugar found in it. Clamminess of the saliva, with an unnatural sense of heat in the mouth, especially on awaking in the morning, is a common dyspeptic symptom.

There is much misconception about the con-

nection between constipation of the bowels and dyspepsia. By many persons the two affections are regarded as identical, and it is common to hear a dyspeptic say, "My digestion must be all right, for my bowels are quite regular." On the other hand, simple constipation is commonly called "indigestion." But although generally associated, the one may exist independently of the other. It will be hereafter shown that the tendency to constipation varies with the particular kind of dyspepsia present. The opposite condition of the bowels is also a symptom of dyspepsia. In foul digestion, if the undigested matters are not thrown off by vomiting, diarrhœa generally ensues. Putrefactive changes are the cause of this.

We are now and then consulted on account of a very troublesome kind of looseness of the bowels. They become disturbed after each meal; and the connection of cause and effect is in some instances so close that the person is compelled to rise precipitately from the breakfast or dinner table. There may be no indication of stomach disturbance; but the intimate relation between the stomach and lower bowel

is thus proved. The commencement of digestion in the one is the signal for increased peristaltic action in the other. It happens, ordinarily, that the weakened action of the stomach produces its counterpart in the colon, the result being constipation.

A very important but neglected source of knowledge lies in the condition of the fæcal evacuations. There is a natural repugnance to their examination, but everything should yield to scientific necessity. For chemical tests the fæces are not so available as the urine, but even careful inspection is often a great assistance; and by the aid of the microscope important results are easily obtained. The size, shape, and consistence of the fæcal masses afford useful information. Pellet-like lumps of fæcal matter are formed in the colon by spasmodic contraction of its cells. Small elongated and flattened portions of fæces, are formed by a spasmodic action of the rectum, and sometimes cause alarm from the idea that they are due to organic stricture.

The fæces in dyspepsia often have this peculiarity. They sink in water, because the

gases which ought to be mechanically retained in them are wanting.

Scantiness or redundancy of bile is announced by the degree of brown colour in the fæces. In some forms of dyspepsia a more or less black colour of them occurs, and a peculiarly offensive odour usually accompanies this.

With the naked eye alone we may frequently learn a good deal of the composition of fæces, and the nature of the food from which they are formed. Occasionally we may see the latter nearly unchanged, as in lientery—that form of diarrhœa in which the digestive functions are almost suspended. Husks of seeds, kernels, woody fibres, pieces of bone and gristle, fragments of arteries and other indigestible *débris*, may be commonly observed, and naturally go to form the fæces.

Substances too minute for recognition by the unaided eye, yet present in quantities sufficient to have caused bad effects, are easily determined by the microscope. The ripest pears abound in gritty and wholly indigestible particles, which are easily detected by their peculiar cell formation; and so it is with many other

substances. By this method something may be also learned of the derangement of particular functions: thus the detection of starch granules would prove the imperfect digestion of this aliment, since these particles are not found in healthy fæces.

The presence of worms in the intestines has been determined by the microscopic discovery of their eggs in the fæces.

A great deal may be gathered from the state of the dyspeptic's urine, but my limits will not allow justice to be done to this extensive subject. In all refractory cases, careful and repeated examinations of the secretion, by the precise and various means which science has placed at our disposal, are indispensable. Sometimes the determination of sugar or of albumen clears up doubts, by showing that the dyspepsia is but secondary to a graver disturbance of the general system. But when dyspepsia is itself the primary disorder, much that is important to diagnosis as well as treatment, may be obtained from the examination. Thus a deposit of uric acid forbids the use of acid remedies; on the other hand, a deposit of

phosphates forbids the use of alkalies. A brick dust-like deposit of yellowish lithate of ammonia is a common result of dyspepsia; it generally occurs during an aggravation of the disorder, or as a result of dyspepsia from impropriety of diet. Red lithate of ammonia is almost invariably the result of a febrile or inflammatory condition of the system. Pink lithate is rare, and indicates liver disorder.

Crystals of oxalate of lime are abundant in the urine of many dyspeptics. They seem especially so in that of hypochondriacal, irritable, and nervous patients; and Dr. Prout believed in the existence of a true oxalate of lime disease. But all who have had much experience in the examination of urine are aware that oxalate of lime is frequently present, without any associated symptoms.

It is well known that it exists ready formed in some articles of food, as rhubarb-stalks, tomato, &c.; while many other articles, as sugar, yield it freely from their elements. While, therefore, a considerable and persistent deposit of oxalate of lime must be recognised as a symptom of a severe form of dyspepsia,

it is unimportant when occurring in minute quantities, or only at intervals.

An alkaline state of the urine, with a deposit of phosphates, is common in dyspepsia; and then it not unfrequently happens that, in addition to flatulence and nausea, there is marked acidity of stomach. Here the state of the urine is an important guide to treatment, as the mineral acids, contrary to what might otherwise be expected, are generally found useful.

For some hours after a meal the acidity of the urine is constantly diminished, so that it may become neutral, or for a short time even alkaline. In connection with dyspepsia this is an interesting matter, and further observations may yet lead to important practical results.

A persistent excess of urea in the urine is a more common accompaniment of stomach disorder than is generally supposed. I have seen some well-marked instances of this excess in cases of organic disease of the stomach.

In several cases of dyspepsia in men, I have observed a symptom which seems to have been overlooked. It is a sensation in the urethra

variously described: in some instances as a mere uneasiness; in others, as a scalding or smarting, either when urine is being passed or at other times. Or, again, as in a case I once met, there was "a constant sensation of something which ought to come away." In this case the patient was habitually constipated, and he experienced the urethral annoyance most when the bowels were distended with gas. It is certain that this symptom is quite distinct from the irritation caused by the passage of urinary deposits; it is sometimes associated with urethral discharge.

The generative functions often suffer severely, spermatorrhœa being not merely kept up, but induced by dyspepsia.

The connection between the lungs and stomach, by means of the pneumogastric nerves, is so intimate, that the suffering of the one is very frequently transmitted to the other. There is generally some truth in wide-spread and traditionary ideas, and one is preserved in the popular term "stomach cough." But on this subject great mistakes are constantly made. Too often a cough which is caused by serious

disease of the lungs is by the patient supposed to be "from the stomach."

The stomach disorder which frequently accompanies chronic bronchitis, as well as the vomiting which occurs in advanced phthisis, teach us how the lungs may affect the stomach.

On the other hand, although there is often more difficulty in deciding, we meet cases in which the stomach as certainly affects the lungs. The association of cough with stomach symptoms, and the absence of local cause, proved by physical examination of the lungs, will aid diagnosis essentially. Stomach cough is usually of a short dry character, unattended by expectoration. The dyspeptic conditions of the throat, and especially of the uvula, already described, are also productive of cough.

Asthmatic symptoms, and difficulty of breathing in general, are amongst the most usual indirect effects of dyspepsia; nervous influence is often concerned, but mechanical pressure of the flatulent stomach against the diaphragm has also much to do with these.

The circulation of the blood is often disturbed suddenly and with violence. By far

the greater number of what are called functional diseases of the heart are referrible to dyspepsia. Palpitation and intermittent action are usual symptoms; sometimes the heart's action seems temporarily arrested, and only recovers itself by a struggle. This symptom frequently attacks the patient when in bed, and causes great alarm. The best remedy is a draught containing ammonia, or brandy.

Throbbing of the arteries is common, and, when combined with a hot dry skin, constitutes a condition resembling fever. A remarkable instance of local excitement in the circulation happens in that form of dyspepsia which depends on an irritable condition of the mucous membrane of the stomach. Throbbing at the pit of the stomach is experienced; and if the hand of the observer be pressed upon the part, strong pulsations of the abdominal aorta may be felt, although the heart itself may be tranquil.

There are few persons who are not familiar with an affection popularly called "fidgets," either from having experienced it themselves,

or, what is almost as disagreeable, from having witnessed its effects in the person of a friend. It consists of an uncontrollable tendency to motion in the lower limbs, the position of which the patient continually changes, accompanied by a sense of fatigue and a strong desire for rest. No one can exactly describe the sensations experienced, but all agree that they are distressing. This affection is a common result of dyspepsia. It comes on after dinner, almost invariably, and especially should fatigue have been previously incurred.

Another singular sensation that I do not hesitate to refer to dyspepsia, is the fancied unnatural size of the limbs or other parts of the body. Although a common affection, it has not been described by any previous author. It generally comes on at night when the patient awakes, disappears on moving the affected part, and after reflection has corrected the erroneous impression. I have met an instance, however, in which the delusion continued during the day. One or more of the limbs, or even the head, is felt to be of gigantic proportions: the hand to rival that of an Egyptian Colossus; or the

head, that of the Sphinx itself. Sometimes the tongue alone is affected, and then the patient has the sensation of the tongue being far too large for the mouth.

That dyspepsia will not only disturb but pervert the senses of sight and hearing, is well known to those who make these functions a special study. The patient may be simply deaf, or may at the same time fancy that he hears all sorts of sounds ; such as the ringing of bells, beating of drums, or the thumping of hammers. Simple dimness of vision may be complained of, or imaginary objects seen. One of the commonest results of stomach disorder is the appearance of dark bodies or flies (*muscæ volitantes*), close to and in front of the eyes. Flashes of light, transient darkness, and actual spectra, all own the stomach as their source.

Many dyspeptics suffer intensely from various mental affections ; others, on the contrary, are entirely free from these symptoms. It is remarkable that mental affections prevail most in cases where other, and especially stomach, symptoms are least marked. Physical conformation has much to do with these differences.

The man of nervous temperament is proverbially more a prey to morbid mental impressions than the lymphatic; the sanguine more excitable than the bilious. But outward appearance is not to be always relied on. A robust exterior is often associated with a depressed or even disordered mind. It is not difficult to conceive how the mental powers become affected by dyspepsia. The brain or connecting link between the material and the immaterial worlds is physically affected. The exact nature of the connection we cannot hope to comprehend. A barrier is presented against our researches, impassable as the broken bridge in the "Vision of Mirza."

It is only when the patient begins to regard his professional adviser as a sympathising friend that any allusion is made to his mental woes. So variable are these troubles that nothing would be more difficult than to describe them. They embrace simple obtuseness and confusion of thought, indecision of purpose, and total inability to fix the attention. In extreme cases all that constitutes complete prostration of mind is experienced.

On the other hand, a morbidly acute and

over-sensitive mental condition is very common. The patient feels undue anxiety on every subject; is absurdly alive to the slightest touch of ridicule, and finds insult where none was meant. He is constantly apprehensive of danger; and, if his mind dwell on religion, sees in it nothing but dark threatenings unrelieved by a gleam of hope. But worse than all, are fears and forebodings about health. Sometimes the mind becomes concentrated on a particular organ, often on the stomach itself, and this has an undoubted injurious effect. A condition of causeless irritability seizes upon some sufferers, accompanied by a peculiarly distressing sensation: which, as far as I have been able to form an opinion, is a sort of consciousness of the operations of the mind, as if it were external to itself.\* Associated with this, there is a sensation of oppression in the head, frequently ending in headache.

\* It has been well observed, that when digestion is perfect, we are not conscious that we possess a stomach. It is, in fact, from the action of disease that we become conscious of the performance of many of our functions which then are felt irksome. Close observation leads me to believe that the functions of the brain are not in this respect exceptional.

Insanity may be excited in those pre-disposed to it by dyspepsia. Here, as in other cases, extremes meet ; and I have myself known instances in which the most complete dyspeptic depression has suddenly changed to excitement. Sometimes an ungovernable, or even a vicious, impulse is experienced.

A general sense of weariness, heaviness, or sleepiness, without adequate cause, is a very common complaint with the dyspeptic. He experiences all the sensations which over-exertion of body or mind produces. But there is this marked difference : the sense of fatigue, which is merely a symptom of dyspepsia, is in general diminished by real exertion. We sometimes see remarkable instances of this. Thus a patient, who had just previously declared his inability to walk even a short distance, may presently be found ardently engaged in some athletic game. Another who has complained of such a degree of mental prostration, that it was a trouble to *think*, may immediately excel in argument.

Sleeplessness is an ordinary effect of dyspepsia, and heat and dryness of skin its usual

accompaniments, especially if a late supper has been taken. There are few who have not experienced a night of discomfort from this cause. The feet are so hot that the patient keeps constantly moving them in search of a cooler position, the hands are dry and burning, the mouth parched, the mind incapable of repose, and the weary hours drag on until sleep ensues from mere exhaustion.

The confirmed dyspeptic suffers in a different way. Sleep comes at its accustomed time, but does not bring with it real repose. Dreams in which fear, distrust, and other disagreeable emotions take a leading part, make a mockery of his rest. Nightmare, with its horrors of overwhelming waves, falls from precipitous heights, infuriated bulls and other implacable monsters, are generally traceable to an enfeebled stomach. The same may be said of talking during sleep, and of somnambulism itself. Grinding the teeth is an ordinary symptom of gouty dyspepsia, and is sometimes so habitual that the organs are worn by the friction.

## CHAPTER III.

### ACCIDENTAL DYSPEPSIA.

HAVING traced the causes and the symptoms of dyspepsia, I now proceed to describe the various forms of the disease itself; taking first those which may be termed accidental, because they are produced in the healthy subject by accidental causes.

It may be safely affirmed, that every one has suffered at one time or another from transient difficulty of digestion. Who is not conscious of having experienced bad effects from one of the following causes?

Simply eating in too large a quantity.

Indulging the appetite with too great a variety of food.

Partaking even moderately of a single kind of food, against which there is a constitutional repugnance.

Now, as is plain enough, these causes are likely to be mixed together, and the symptoms which result will often be more or less confounded. However, sufficient distinction usually exists to admit of their being so grouped as to constitute three distinct forms of dyspepsia.

If dyspepsia occur in a healthy person from eating too largely, but without deviation from accustomed diet, he is apt to be troubled as follows. There is a sense of weight, fulness or other uneasiness in the stomach. Flatulence frequently succeeds, but the eructations are tasteless, as carbonic acid is chiefly the gas evolved. Sleep is likely to be disturbed, and nightmare or palpitation of the heart to ensue. Here we have the simple effects of more material than is required for the sustenance of the body. Digestive trouble is produced by *relative* deficiency of gastric juice, the delay of food in the stomach giving rise to fermentation, and fermentation to flatulence. This effect of repletion is very favourably regarded by some Asiatic nations. The noisier the escape of gas from the stomach, the better the breeding of

its proprietor, and the greater the compliment from the guest to the entertainment of his host.

Even amongst people who are careful not to take too much at a single meal, this kind of dyspepsia is frequent, and may become chronic. In these cases the meals are taken without sufficient intervals between them, or else the quantity of food consumed is as a whole too great. Perhaps a late and substantial breakfast is succeeded by a meat luncheon, and dinner is followed by a heavy supper. To supply the waste of the body, so much material is seldom required, and still more seldom taken without injurious consequences.

The dyspeptic attacks produced by mental emotion, by exercise after a full meal, by the hot or cold bath, or by any cause that violently disturbs the balance of the circulation, are similar to that just described, and may be classed with it.

In these cases, sudden disturbance of nervous force, congestion, or deprivation of blood, throws the digestive organs out of working order. Such are instances of the rapid production

of dyspepsia from incompetency of the organs themselves.

The following is an example of the second kind of accidental dyspepsia : popularly it would be termed a "bilious attack."

A great variety of those dishes which luxury has made inseparable from a modern feast, —soup, fish, rich entrées, sweetmeats, fruit fresh and dried, nuts, &c.,—with an almost equal variety of wines and liqueurs, are taken. Nevertheless the total quantity of food may not be in excess. The immediate effects are less marked than in the preceding kind of dyspepsia, but retribution follows. Sometimes, and particularly in children, there are nausea and vomiting. If the last has not happened, a restless and feverish night is passed ; or, if sleep comes on, it is troubled and fitful. Towards morning the patient sleeps heavily, through mere exhaustion, but wakens to begin the business or pleasure of the day more fatigued than when he retired to bed. There is a foul taste in the mouth, and an unnatural sensation of heat causes a craving for cold water ;—soda water, from its coldness and sedative nature, is

often substituted. Slight headache is felt ; and constant eructations give great annoyance, the flavour of which is well compared by the patient to rotten eggs. The headache, which is chiefly in front, is worse on rising from bed, and increased by stooping. Breakfast is almost untouched, the bowels are unmoved, and the pain and discomfort continue until dinner-time ; then, if food can be taken, relief sometimes immediately follows. This relief after taking food is analogous to what occurs in another instance. A stimulating draught is the best remedy after excess in drinking ; and “a hair from the dog which bit you,” is the vulgar but appropriate term for the remedy.\* But very often the symptoms are more severe ; the headache is excessive, and described as “splitting the head.” There are nausea, and vomiting of foul-smelling, frothy material, in which yesterday’s dinner may be recognised. Severe retchings ensue ; and at last bile, almost pure, makes its appearance.

\* In the *Medicina Statica* of Sanctorius the same advice is given, as follows :—

“*Si nocturna tibi noceat potatio vini,*

*Hoc tu mane bibas iterum et fuerit medicina.*”

After the stomach distress, relaxation of the bowels often happens.

The taste and smell of the eructations, and the time at which symptoms occur after the meal, prove that the fermentation in the stomach is of a kind totally different from the preceding.

One, at least, of the gases evolved is sulphuretted hydrogen, and to this the fetor is due. It would be useless to waste time in speculating on the remote causes of this form of dyspepsia ; but why, we may ask, should a great variety of food be more productive of it than the same quantity of any one, or a few of the same articles ?

The clue lies in the fact that different secretions are employed in the digestion of different elements of food, and that food, although consisting of the same elements, may differ much in digestibility. When, therefore, the articles taken into the stomach are both numerous and varied, great digestive confusion results. The gastric juice reduces the substances easiest of digestion, leaving others comparatively unaffected ; while these, under the influence of heat

and moisture, rapidly undergo changes allied to putrefaction.

What causes alleviation after dining? This appears to me the explanation. The stimulus of newly-arrived food causes the stomach and duodenum to contract, whereby offending matters are expelled; and the antiseptic properties of gastric juice, freshly drawn out by the same stimulus, assist by neutralizing the semiputrescent remnant.

Habit reconciles the digestion to changes of diet which were at first repugnant. People often suffer from the kind of dyspepsia just described, at the outset of continental travel; but afterwards, although the diet is the same, the stomach becomes accustomed to it, and ceases to suffer.

The third variety of accidental dyspepsia may be thus exemplified. Healthy persons sometimes tell us that *certain things* "disagree with them," and it may be a single article of diet that so affects them. It would be impossible to enumerate all these peculiarities. Substances of reputed indigestibility are generally, but not invariably, the offenders. Many declare they

can digest anything but pork, but I have known the same complaint made against mutton ; others cannot take fat of any kind, or pastry, without bad effects.

The symptoms in these cases are various. A foul taste in the mouth, nausea, and vomiting, are probably the most frequent.

There is one symptom which deserves particular notice. An eruption of the skin appears after eating some particular article of diet. When partial, it sometimes takes the eczematous form, and vesicles crop out round the lips : more frequently it is diffused over the body as urticaria, or nettle-rash. This affection, the name of which is very descriptive, usually comes on within a couple of hours after eating the food which causes it. Sometimes the face, especially about the eyes, is swollen, as well as intensely red, and the itching of the body is often very distressing. A smothering sensation, unnatural heat, thirst, general febrile disturbance, nausea, and vomiting, not unfrequently accompany nettle-rash.

A number of articles are known to be especially productive of nettle-rash, as oatmeal,

cucumbers, mushrooms, shell-fish, and especially mussels. I know a lady who is always affected with an eruption on the face from eating lobster; and a gentleman in whom the same thing is produced by taking vinegar. But the most severe case of nettle-rash I ever saw was that of a young woman, from eating mackerel. An alarming degree of prostration alternated for some time with violent palpitations of the heart; and the entire skin, except where marked with wheals, was of a vivid red colour.

Taking water charged with lime, causes irritation of the skin in some persons.\* The sympathy between the lining membrane of the intestinal tube and the exterior of the body, between skin and mucous membrane, is highly interesting, and helps us to understand the

\* That a similar effect may be caused by the external contact of impure water, the following extract proves:—

“We repaired to a neighbouring well, and found the water so hard that it raised lumps like nettle-stings in the bather’s skin. The only remedy for the evil is an unguent of oil or butter, a precaution which should never be neglected by the African traveller.”—*First Footprints in East Africa*, by Lieut. Burton, p. 232.

dependence of certain chronic skin diseases on confirmed dyspepsia. A simple transfer of irritation from mucous membrane to skin seems to be all that happens in some cases. A general disturbance of the system at other times associated with the irritation, shows that the blood itself is affected. The highly deleterious effects of some articles of food—as sausages which have undergone certain changes—appear due to an action in the blood analogous to fermentation.\*

Dyspepsia induced in healthy persons by unwholesome food, or by simple though coarse and unaccustomed diet, will come under the head just considered.

“The singular sausage poison of Wurtemberg is an animal matter in a peculiar state of decay, and does not contain any poisonous compound, only a poisonous *state* or *condition*.”—*Gregory's Handbook of Organic Chemistry*, 4th ed., p. 42.

## CHAPTER IV.

### HABITUAL DYSPEPSIA.

WHAT has been said about accidental dyspepsia, must be borne in mind and applied in considering habitual dyspepsia. The relation between them is of the closest kind, the difference is mainly this: in the habitual disorder an increased susceptibility in the organs leads to a constant repetition of digestive disturbance from slight causes, and this constitutes a true chronic disease. It is noticeable, that dyspeptic symptoms, when chronic, are usually less severe and urgent than when the same symptoms occur in the accidental form. Thus, the vomiting and retching of a mere surfeit are generally more aggravated than when they constitute symptoms of confirmed dyspepsia. Sometimes, indeed, the disease comes on so gradually and continues so long undeveloped, that

we find difficulty in determining its existence and common sense can alone decide.

Thus, if a moderate indulgence of appetite is habitually followed by sensations like those caused by excess in a healthy person, it is plain that something more than amount of food is at fault. If the repugnance of the system extends to a number of ordinary articles of diet, there must be more than mere idiosyncrasy in question. The same argument applies to other causes of accidental compared with confirmed dyspepsia.

Habitual dyspepsia consists in the frequent occurrence of uneasiness or pain after taking an ordinary quantity of digestible food.

In every science some classification of the subject treated is desirable. Practical inferences are greatly facilitated by grouping together the important facts. Various divisions of chronic dyspepsia have been made by authors, but they all appear wanting either in distinctiveness or in comprehension. It might seem at first that a perfect basis of classification was to be derived from considering the derangements of the separate functions of digestion. But the

subject presents great difficulties, because we are not always able to distinguish clearly between such derangements, and more than one function may be at the same time in fault.

In order to avoid the evils of speculation and the substitution of theory for facts, a more practical course is desirable. In the present state of knowledge, deductions from close observations of the various symptoms of dyspepsia, and of the manner in which they group themselves, are the most reliable. No classification can be perfect; but this has the merit of convenience, and need not be adhered to in an absolute manner.

According to my observation, five kinds of habitual digestive derangements are to be plainly recognised. They are named as follows; partly from their essential natures, and partly from the symptoms which characterise them.

**SLOW DIGESTION**—or Simple Dyspepsia.

**UNDUE ACIDITY IN DIGESTION**—Dyspepsia with acidity.

**PAINFUL DIGESTION**—Dyspepsia with gastric pain; and frequently soreness.

**FOUL DIGESTION**—Dyspepsia with fetid eructations.

**IMPAIRED DIGESTION, WITH MENTAL DISTURBANCE**—Dyspepsia in which mind symptoms predominate.

*Slow Digestion.*

This constitutes the most common form of dyspepsia. It is the bane of those who ignore natural laws, and forget that the healthy action of the stomach is dependent on the condition both of body and of mind. Those whose pursuits oblige them to pass much of their time within doors—men of letters, and of business, whose minds are seldom perfectly relaxed; administrators, speculators, and the various professional men, whose callings chain them within the excitement of London life—fall ready victims to it. Women, as might be expected, are less liable to it than men.

It occurs in all habits of body, but oftenest in persons of an irritable or anxious aspect, popularly recognised as “dyspeptic looking.” It is comparatively unknown amongst those who associate even a free indulgence at table

with the healthy pleasures and pursuits of the country. Eating too rapidly is a common exciting cause of the disorder; as is also imperfect mastication from loss of teeth.

This kind of dyspepsia, in its milder degrees, most resembles the effects upon the healthy stomach of more food than the system requires; but there is this notable difference: in the diseased stomach the requisite amount of nutriment is with difficulty digested. "I should be quite well if it were not necessary to eat," is a common statement. A dinner not exceeding ordinary limits is followed at varying intervals but usually within an hour, by a feeling of weight and oppression in the stomach. For several hours afterwards the patient experiences discomfort, which in some cases subsides before bed-time. Should even a light supper be indulged in, nightmare or troubled dreams are almost certain to result. The symptoms vary in number as well as severity: sometimes there is great flatulence, accompanied by shooting pain in the stomach. Undoubtedly in these cases the gases are products of fermentation, and the eructations, consisting chiefly of car-

bonic acid, are tasteless. Palpitation and irregularity of the heart, coming on principally during the night, frequently cause great anxiety. Constipation often gives trouble, but by no means invariably, for a common statement made by patients is, "I can hardly suffer from indigestion, my bowels are so regular." In some cases the tongue is foul, especially on awaking in the morning, but in others that organ is little, if at all altered. The appetite may be as good as in health; in some instances, indeed, it seems greater.

All the symptoms of this form of dyspepsia are referrible to undue delay of food in the stomach; the immediate causes of the sense of oppression have been already considered.

Here is a typical case.

A man of middle age, busily engaged in commercial pursuits, consults us. His habits are temperate, and it would be difficult to persuade him that he is not in all things a man of moderation. Except for a slightly careworn expression, his naturally dark face looks healthy. But there is a restlessness about him, as if he thought it losing time to speak

of his health. He says he has been from boyhood wholly engrossed in the routine of business. Improvement of fortune and perfect freedom of action brought with them no change.

He lives, or rather sleeps, out of town, and in consequence entertains a notion that no matter how he treats himself, he has no right to feel unwell. He manages himself in some respects as if he were an iron locomotive rather than a creature of flesh and blood; indeed, his principal movements during the year may be found on certain railroad time tables. After an unsubstantial breakfast he hastens to catch a train by which he invariably comes to London. Ten o'clock begins the business of the day, which is steadily persisted in until one. He now leaves his office for a short time, and swallows hurriedly, rather than eats, a chop—on busy days he has no chop, and no substitute for it.

It is past six when our patient finds himself at the dinner table. He has then a feeling of exhaustion, which a glass of sherry somewhat lessens. He eats largely of various dishes, including pastry, and perhaps takes malt

drink freely, winding up with a fair allowance of port. Soon after dinner his troubles commence, but not always to the same extent. On bad days he suffers from an almost intolerable sense of weight and tightness about the stomach. For the relief of this he unbuttons his waistcoat, but finds little gained by it. He paces the room, and beats or chafes over his stomach, as if to allay the brooding storm. Very soon his stomach might be compared with a windbag of Æolus. In vain he struggles to expel the gas, and at length sinks exhausted into a chair. Hot tea is now swallowed freely, as he fancies it gives relief by displacing the gas.

Our patient further states that he sleeps heavily, though uneasily—that he wakes in the morning unrefreshed, and is very averse to rising—that his mouth is clammy and his tongue covered by a creamy coating. He also notices that his urine often contains a thick reddish brown or yellowish sediment.

*Undue Acidity in Digestion.*

That form of dyspepsia in which acidity is

a prominent symptom must be regarded as a more serious disorder than mere slowness of digestion. We have now depraved secretions to deal with; there is a sour taste in the mouth, either constantly or at intervals. In some cases the saliva has an acid reaction; acid eructations occur, and even the breath may have a sour smell. This general condition is greatly influenced by the nature of the food. A diet consisting chiefly of vegetables is much more productive of acidity than one mainly of animal food. The appetite is generally very bad; farinaceous food is ill borne, yet there is often a loathing of meat. Flatulence is in some cases troublesome, while in others it is not complained of.

The chemical explanation of an unnatural production of acid from farinaceous food is reasonable. By the natural functions, starch is converted into sugar; while, by fermentation, a process foreign to the organism, the sugar becomes acetic acid. This acid is, however, by no means the only one which is abnormally present in the stomach; and marked acidity is sometimes found to exist after an

exclusively animal diet. It was, therefore, long ago maintained by Dr. Graves, that acidity was caused by undue secretion of the natural acid of the stomach, which he affirmed to be lactic acid.\* The question is a difficult one; but it will probably be found that the acidity of dyspepsia is derived partly from fermented food, and partly from secretion.

According to my experience, acidity is a prominent feature in two very opposite habits or states of constitution. One is characterised by debility—the anæmic tendency, and a general want of tone; in the other, plethora is more or less marked, and the vital functions are vigorous.

Generally speaking the acidity of the plethoric class indicates so-called gouty dyspepsia. Yet the aspect of some gouty patients closely coincides with that of the pallid and weakly subjects of acidity. Gout is greatly modified by the constitution of the patient, and in robust persons has a tendency to expend itself in inflammation. The word *expend* is used because, after an inflammatory attack, relief of the dys-

\* Clinical Lectures, edited by Dr. Neligan, vol. ii. p. 209.

peptic and other symptoms is commonly experienced, and from this an impression has arisen that a fit of the gout does good. On the other hand, inflammatory gout is less frequent in delicate people than in the robust, and in women than in men. Probably all cases of dyspepsia with undue acidity have an alliance with gout, which is only developed when other circumstances are favourable.

A form of dyspepsia characterised by extreme acidity, accompanied by brain symptoms, and almost always terminating fatally, occurs in France.\*

I shall now try to illustrate from my own experience the forms of dyspeptic acidity commonly met.

The anæmic subjects of acid dyspepsia are frequently found amongst hospital out-patients. Let us take an example: it is a languid-looking, ill-nourished woman of middle age. She is the wife of an artisan, has reared a family, and looks prematurely old. Her married life has been one of unvarying toil. Amongst other causes, suckling too long has injured a constitu-

\* Des Dyspepsies, par M. Chomel, p. 96.

tion originally good. It is not affirmed without reason, that she has never been so well in town as in the country, whence she came, but which she has not visited for years. There has been no autumnal change of air ; no yearly seaside sojourn for her. More special causes must nevertheless account for unnatural paleness, and the dusky semi-circles beneath her dull eyes. She lives in an ill-ventilated house situated in a close court. Often, during the heats of summer, she turns in disgust from the window opened "for air," but which admits noisome effluvia from badly constructed drains. Chained to domestic duties, she seldom gets out of doors. Her appetite is so bad that a bare sufficiency of ordinary food is taken with difficulty, and scanty means allow no indulgence of the palate. To avoid a painful sense of exhaustion and to relieve headache, she is in the constant habit of drinking tea ; and this, without solid food, is often a substitute for dinner. What is most complained of is, that "every kind of food turns sour in the stomach." She is aware of this, from sour eructations and the taste in her mouth. Heartburn annoys her, and sometimes

a small quantity of very disagreeable, rancid oil-like fluid rises to the mouth ; vomiting of "stuff so sour that it sets her teeth on an edge," occurs occasionally, and is followed by temporary relief. She is always worse after vegetable diet : even bread disagrees with her. She wonders, too, that arrowroot, sago, or any farinaceous food, ever so carefully prepared, are especially unsuitable, although these articles have been recommended for her. The tongue is white and flabby, its edges being indented by the teeth. The teeth themselves, discoloured and carious, are in a wretched condition—a circumstance to be attributed to the acid state of the saliva. The bowels are sometimes constipated, and sometimes relaxed.

Here is an example from a very different class of sufferers from acidity :—

He is a stout, rubicund, good-tempered gentleman, in easy circumstances, and at peace with the world in general. People regard him as "a picture of health," and often congratulate him on his good looks. And yet this gentleman is not without his sufferings : he has already felt the anguish of gout, and knows there

is more of it to come. But notwithstanding occasional and even more permanent drawbacks, to be presently mentioned, he enjoys life famously. He dines freely off a variety of rich dishes, and drinks without stint old port and claret. On all these matters he is an authority at his club. He seldom suffers from weight or oppression after meals, but is sadly troubled by acidity. This comes on occasionally after any kind of food ; but certain articles, such as fruit and pastry, are most productive of it. He tells you, "I know exactly what suits me—exactly what causes acidity, and what does not." Strange enough, however, it comes on day after day, although he says he is ready to make any sacrifice to get rid of it. The truth is, our patient is disposed to be dogmatical on the subject of diet, and looks with great suspicion on any interference with it. Advice on the subject must be very much in accordance with his own inclinations, or there is little chance of its being followed. This makes it difficult to be of use to him. He complains of occasional oppression, fulness or confusion in the head, and has a habit of grinding his teeth during sleep.

The bowels act regularly, and his tongue, although it may be foul on rising, recovers itself completely during the day. He notices "red sand" in his urine, and is liable to pain of the loins. These symptoms are regarded as constituting "gravel," and the dread of this disturbs him more than anything else.

*Painful Digestion.*

No kind of dyspepsia is better marked than that next to be described, and it is also a common affection. Pain, generally of a dull character, is felt after meals; along with the pain, soreness at the pit of the stomach often exists, and sometimes the soreness is permanent. The tenderness is commonly restricted to a spot in the middle line of the body, immediately below the breast-bone. In some cases, indeed, this spot can be covered by the tip of the finger; while, in others, it is much more diffused. It often extends upwards under the bone, which consequently feels sore on pressure, or the tenderness is felt towards either side. When the right side is affected, it is usually in the direction of the cartilages of the

ribs. It is frequently supposed in these cases that the liver is involved, but the duodenum appears to me the part usually at fault.

This tenderness is commonly associated with an unpleasant feeling of heat—"a burning sensation," as it is often termed by patients; "tearing," "rasping," "gnawing," "dragging," as well as various anomalous sensations under the breast-bone, are also complained of at varying intervals after taking food, but generally within a quarter of an hour.

As might naturally be supposed, the intensity of the symptoms is proportionate to the quantity and quality of the meal.

When the stomach is empty, a sensation of craving or emptiness gives most trouble. This often causes a false appetite, which, by inducing the patient to eat heartily, aggravates his sufferings. Thirst generally causes much annoyance; heartburn and water-brash, with or without acidity, nausea, vomiting, and headache, are not unfrequent attendants. The state of the tongue is very characteristic. The body of the organ frequently presents a white coating, but its extremity is almost invariably redder than is

natural ; while its papillæ are prominent, and have a peculiarly irritable appearance. From mere inspection of such a tongue in the adult, we can with tolerable certainty predicate pain and tenderness at the pit of the stomach. In children this state of tongue must be less relied on, as owing to the greater impressibility of the organ, it assumes an irritable appearance from trifling stomach disorders. In this form of dyspepsia the bowels are often quite regular.

The epigastric tenderness has been differently explained, some writers believe it to be due to mere irritability of the mucous membrane, while others ascribe it to chronic inflammation. If we consider how exposed the stomach is to injury from without, and still more to bad treatment within, we must conclude that it enjoys greater immunity from inflammation than any organ in the body. The stomach has been known to tolerate for years rough and hard substances of considerable size. Even the effects of molten lead and boiling water have been for a time endured by this delicately constructed but resistive organ. Concentrated mineral acids, or such strong corrosive agents,

appear alone capable of producing acute and fatal inflammation of the stomach.

Unequivocal sub-acute gastritis on the other hand now and then occurs. Possibly then, slight gastric inflammation, only manifesting itself in dyspeptic symptoms, may long exist without further development. A chronic inflammation of the lining of the eyelids is often met, which, if not arrested by treatment, may continue for months or for years, and a similar condition of mucous membranes not within reach of observation may fairly be inferred. Few opportunities are offered of inspecting stomachs in which such changes are suspected, and after death it is not always easy to decide between the effects of inflammation and congestion. Inflammation accompanying ulceration of the stomach, an affection not only recognised with precision after death, but generally during life, is here excluded.

The question remains to be answered,—Is epigastric tenderness a proof of inflammation in the stomach? I believe not generally. The natural susceptibility at this part of the abdomen is very variable. In some healthy persons,

moderate pressure is attended by a feeling of soreness. In all the pit of the stomach is a sensitive part. Even violent throbbing, coincident with tenderness, affords no proof of inflammation. Frequently in these cases the heart itself is tranquil, and the nervous relations between the stomach and the abdominal aorta are sufficient to explain the arterial excitement. We can generally identify the soreness caused by gastritis, by its being more continuous ; by greater dryness of skin, more thirst, a quicker and harder pulse,—in short, greater disturbance of the general health than in cases of mere morbid sensibility of the stomach. This morbid sensibility may be reasonably explained. It seems to be occasioned by a deficiency in the epithelial lining of the gastric mucous membrane. From some unknown cause the cells which compose this lining are either formed imperfectly, or too rapidly removed. We have seen that the connexion between the state of the stomach and that of the tongue is remarkable ; and we know that the unnatural redness of the latter organ is due to deficiency of its epithelial coating.

This kind of dyspepsia is common to all classes, and to every constitution. It, however, attacks women more frequently than men.

Here is a typical case. A young gentlewoman of delicate conformation and of luxurious habits, makes the following complaint:—From ten minutes to a quarter of an hour after each meal, but especially after dinner, a dull pain of the stomach is felt; sometimes the pain has a twisting or rotatory character, which is particularly distressing. When the pain is severe, it is plainly indicated in the countenance, and worse, an eruption of small vesicles around the lips is liable to appear in a few hours after a bad attack. The appetite is strangely capricious. Forgetful of consequences, she indulges it freely at times, while at others can scarcely be induced to take the needful amount of nourishment. Farinaceous substances agree better than animal food, and certain meats, as veal, are particularly injurious.

During hours of pleasurable excitement, she often remains long without eating or feeling any want of food, but at other times suffers from sudden fits of exhaustion. A sinking

sensation, accompanied by spasmodic pain of the stomach, coldness of feet, and general chilliness, succeeds ; but a glass of wine, together with artificial warmth, generally restore her. Noisy rumbling of gas in the intestines is also a source of great annoyance. Soreness at the pit of the stomach is felt from the slightest pressure, or on any sudden movement. The redness of the tip of the tongue is so marked as to have arrested the patient's attention.

In such a case, late hours, over-excitement, and general neglect of the laws of health, are the exciting causes. Happily, better ideas are gaining ground amongst educated women than prevailed even a few years since ; tight-lacing, a fruitful source of stomach disorder, has been condemned by good taste, and we may hope that other reforms may follow.

#### *Foul Digestion.*

I have already spoken of foul digestion occurring even in the healthy, from eating a great variety of food at a meal, especially food of a rich nature. Like symptoms may occur when

there has been no exciting cause of the kind, and we must then look for the cause in the digestive organs themselves.

Foul digestion is the kind of dyspepsia commonly known as *biliousness*. It chiefly attacks persons of sedentary habits, and it is probably for this reason that women are more subject to it than men. Tailors, shoemakers, and all who live by the needle, are its frequent victims. In the higher ranks of society it also prevails.

The evil of misuse of terms is well illustrated in this disorder. Nothing is more common than for people to say they are "bilious," by which they mean their liver is disordered, and that bile is either secreted in deficient or excessive quantity, or of defective quality. There is rarely any evidence that either of these conditions exists; the so-called bilious attacks occurring independently of the liver, while the stomach is the true seat of mischief. Medical men themselves employ the term bilious far too loosely. But measured by its consequence, the inaccuracy is by no means trivial. First, attention is diverted from the stomach, so that

proper dietary precautions are neglected and the evil is not checked at its source. A good example of this occurred lately in the case of a lady who consulted me. She was subject to the kind of dyspepsia at present described, attended with headache, flatulence, nausea, and vomiting, which I had more than once assured her were not to be assigned to the liver. But the impressions of years were not easily effaced, she persisted in calling the attacks bilious, and in believing that her great enemy was bile. On one occasion, however, it having come to my knowledge that she had eaten plum-pudding, &c., at dinner, I foretold an attack of biliousness for next day. It may seem strange, but the connexion between cause and effect had not been previously observed, or if it had, made no impression on her mind. But the matter was in this instance too obvious to be set aside, and she was fortunately at length convinced that since a "bilious attack" can be produced at pleasure, it may be at least sometimes avoided. A second source of great mischief to which the inaccuracy leads, is the indiscriminate use of purgatives. Biliousness is usually supposed to

be caused by hindrance to the flow of bile, and the conclusion is that the liver requires stimulating. Hence that injurious swallowing of pills and draughts, of calomel, and colocynth, and aloes, and the still more injurious consequences which the whole tribe of patent antibilious remedies is daily inflicting.

In all the kinds of dyspepsia previously described, the symptoms appear soon after a meal, but, in the present case, they usually come on in the morning before food has been taken. The difference between foul digestion and that described as slow digestion is this. In the latter the food being only partially reduced to chyme within the natural period assigned to the process, undergoes common fermentation. In the present form its reduction is delayed so much longer that decomposition proceeds further. This affection must of course be regarded as the more serious of the two. But it is a curious as well as a fortunate circumstance, that the attacks are seldom so continuous as those of the milder affection. From the undigested condition of matters vomited after lying in the stomach from twelve to eighteen hours, it is

plain that its action must have been almost in abeyance during these long periods. If this were of daily occurrence, life could not be long sustained.

The symptoms vary greatly in severity. Fetid eructations, as might be expected, are common. More or less headache or giddiness is generally experienced, and severe throbbing headache is not unfrequent. Sometimes the centre of the brain, from which the pain radiates in all directions, appears to be its seat; at other times it is confined to the forehead or to one or both eyeballs, but in every case the pain is remarkably increased by stooping. There is great nausea, succeeded by vomiting of half-digested foul smelling food. After the vomiting has been frequently repeated, bile, sometimes in considerable quantity, mixed with mucus, is brought up. It is clear that the action of vomiting is then communicated to the duodenum, and here bile had probably been accumulated. The immediate cause of the disorder seems to be duodenal obstruction, since a timely purgative will often avert an attack. Such an obstruction, by interrupting

the passage of food out of the stomach as soon as it is reduced to chyme, would account for digestion being so greatly interfered with.

Occasionally there is neither headache nor vomiting; and in the latter case, unless diarrhœa comes on, the disturbance of health is not much protracted.

In this form of dyspepsia, the bowels are usually constipated; nevertheless, diarrhœa, during an attack, is not unusual, and is, more often than vomiting, attended by marked relief.

The intermittent tendency of this disorder is sometimes very marked. I remember the case of a gentleman, who was for many years the subject of severe attacks of the kind. They took place at intervals of from a fortnight to three weeks, and, being so habitual, never caused alarm; resigning himself to his fate, he remained in bed for the day or two during which his illness lasted.

The following is an instance of foul digestion.

Our patient is a stout gentleman, a public employé, and, both from necessity and choice,

of sedentary habits. He is a *bon vivant*, a whist player, and a man of late suppers of the more substantial kind. He tells us, however, very complacently, that these things do not interfere with his health: he adds that he is not at all dyspeptic, but that he is "bilious."

Now, by the latter term is meant that he occasionally awakes in the morning, feeling slight headache. There is a disagreeable taste in the mouth, and his tongue is so foul that he is obliged to scrape it. He is thirsty, too, at such times, and drinks water freely. In stooping over the basin, a number of phantom black spots are noticed floating between the bottom of the vessel and the eyes. Breakfast is scarcely touched, and all the symptoms gradually become worse. Eructations, the taste of which he compares to rotten eggs, annoy him. An almost insupportable headache, with nausea, followed by vomiting, ensues. The vomited matters at first consist of the contents of the stomach, and portions of the preceding night's supper may often be distinctly recognised. As the retching continues, matters which he compares to the white

and yolk of egg, come up. These are mucus from the stomach, and bile from the source already mentioned. After some hours of suffering, the headache and other bad symptoms subside, and he finds himself the day following as well as if nothing had occurred.

The patient has ascertained that these attacks can sometimes be prevented. When he feels lethargic and drowsy, has a sense of confusion in the head, and as generally happens is constipated, he takes a blue pill at night, and a black draught on the following morning. This plan, he says, sets him all right. But it does not occur to him that the preventive system would be infinitely better—that moderation in diet, and giving up suppers, would be more beneficial than having recourse to remedies, a repetition of which assists in keeping up the disorder.

*Impaired Digestion, with Mental Disturbance.*

Credit must be assigned to the late Dr. James Johnson for having strenuously maintained that dyspepsia may often be recognised by its mental symptoms alone. He pointed out that

when digestive disturbance is least apparent, that of the functions of the mind is usually greatest.

Experience leads me to concur in this, although I do not accept his view, that morbid sensibility of the mucous membrane of the stomach and bowels is always the cause. There is often no positive proof of such morbid sensibility; and notwithstanding direct nervous connexions between the stomach and the brain, it would be erroneous to ascribe *all* the dyspeptic affections of the brain to gastric irritation transmitted by the nerves. It is true that in some instances head symptoms follow so closely upon stomach disturbances, that we must regard them as results of direct transmission. We know that conversely the stomach is affected by the brain; for, as previously stated, bad news may spoil a good appetite, or even bring on an attack of dyspepsia.

In many of the cases under consideration, physical symptoms are overlooked because of their slight nature. It will often be found on questioning a patient that he has an occasional sense of uneasiness in the stomach with tasteless

eructations, a sense of fulness in the head, great uncertainty in the action of the bowels, rather than actual constipation, and that the fæces have at times an almost putrid smell. A copious and persistent deposit in the urine of oxalate of lime is found in certain instances.

From the fact that some cases of dyspepsia shew themselves by mental symptoms alone, we must look for a cause of these affections in something besides irritation transmitted from the stomach to the brain. A fault in the preparation of chyle will afford the explanation, and that dyspepsia is connected with such a fault is plain enough.

The stomach and small intestines constitute the alembic in which the sustaining elements of life are prepared. The sole purpose of digestion is to renovate the blood; the locomotive and secreting organs of the body,—the nerves by which their actions are governed,—the brain itself, which is the instrument of thought,—are only maintained in a perfect state by the circulation of pure and well-nourished blood. If the blood be tainted by the absorption of ill-prepared nutriment, the susceptible

brain is the first organ to suffer. This appears to me the true cause of most morbid mental symptoms, and to be the reason that we often discover dyspepsia from the condition of the mind alone.

We live amongst people who have learned to bear their troubles with exterior calmness, and who as a rule find cause enough for depression in the real anxieties of life. But the majority of the fretted and the anxious, are invalids whose minds suffer acutely through their bodily weakness. A vast proportion of this suffering is caused by dyspepsia, and many people clearly connect a day of mental misery with indulgence of appetite on the preceding day. The patient may be perfectly free from head or stomach symptoms, but is listless and languid. He is unequal to the business of life, or indifferent to its pleasures. Nothing is more important than to fix in each case the connexion between cause and effect, and it then remains for the patient to display the necessary firmness in profiting by the discovery.

In aggravated cases these mental effects of dyspepsia become at length so established, that

a state of mind is produced which continues to exist independently of exciting causes, and the patient becomes a confirmed hypochondriac.

The seat of hypochondriacism has been a point of dispute from the days of Galen to the present time. Writers of eminence have referred it to the brain; some to the blood itself; while certain abdominal organs, as the name implies, have been, by others, supposed to be its source. The stomach, spleen, liver, and mesentery, have been in turn accused. Hypochondriacal affections are not uncommonly attributed to sexual indiscretions; and abuse of the sexual passion is certainly an exciting cause. But the effect of light on the eye, or of sound on the ear, can no more be questioned than the connection which exists between dyspepsia and hypochondriacism. In this respect the disease may be compared with hysteria in the female, where the connexion with the uterine system is generally plain. We meet cases, however, in which the diagnosis between hypochondriasis and that mental condition which is the index or forerunner of actual insanity is extremely difficult.

For sake of convenience all the mental affections which are results of dyspepsia will here be grouped together. There is, of course, a wide range between the most marked hypochondriacism, or virtual monomania, and mere depression of spirits; between the most active self-torment on account of an imaginary ill, or grossly distorted real annoyance, and that passive melancholy, or "*tedium vitæ*," equally incapable of being explained or defined.

Let us hear Dr. Cullen's quaint but graphic description of the hypochondriac. He says:—

"In certain persons there is a state of mind distinguished by a concurrence of the following circumstances. A languor, a listlessness, or want of resolution and activity with respect to all undertakings; a disposition to seriousness, sadness, and timidity as to all future events; an apprehension of the worst or most unhappy state of them; and therefore, often upon slight grounds, an apprehension of great evil. Such persons are particularly attentive to the state of their own health, to every the smallest change of feeling in their bodies; and from any unusual feeling, perhaps of the

slightest kind, they apprehend great danger, and even death itself. In respect to all these feelings and apprehensions, there is commonly the most obstinate belief and persuasion."

Hypochondriacism is stated by some authors to be a disease of middle and of advanced life, and as being apt to increase as life progresses. But many exceptions may be observed. Some old people tell us that with advancing years, they lost their dyspepsia and their melancholy together. And as already said, youth is more frequently oppressed by mental suffering than is generally supposed.

A feeling prevails that hypochondriacism is an imaginary affection, and that its painful impressions are under control of the will. On this account some persons look on it as a disgrace, and the physician who would plainly tell his patient that he was hypochondriacal would incur the risk of dismissal. The truth is, that like hysteria, the disease is capable of being considerably controlled by vigorous exercise of the will, yet both are true diseases, and the sufferers in either case deserve sympathy and compassion.

One might fill volumes with the detail of sensations and of the perverted ideas of hypochondriacal sufferers. Some believe themselves slighted by their friends and the world; extreme sensitiveness makes others voluntary exiles from both. This is a very common form of hypochondriacism; the most groundless suspicions are excited in the patient's mind, causing him to fancy himself the object of ridicule or criticism. From this state of suspicion there is an easy transition to excessive irritability of temper—the bane of many dyspeptics. A combination of irritability and irresolution, often mistaken for bashfulness, is a common symptom. I have known instances in which patients declared their total inability to make up their minds on the most ordinary subjects. Fear of sudden death, or of death from some specific accident, makes others miserable. Lightning is the bugbear of many, and there are individuals to whom, from this cause, the most joyous part of the year is a period of trial and anxiety. Every “summer cloud” really “overcomes” them. No array of statistics to show the infrequency of deaths from lightning will

here avail. The sufferer listens and would gladly be comforted, but his morbid terrors are stronger than any reasoning.\*

The intrusion of unbidden thoughts is a common and very serious annoyance ; too often indeed, such thoughts cause indescribable misery. Sometimes they take a blasphemous form ; at others they are morally wrong, occasionally merely whimsical, but all cause real suffering. In the case of a gentleman, related by Dr. J. Johnson, life was rendered miserable by an illusion concerning a particular number.

Those cases are especially difficult to deal with in which true conceptions are either pain-

\* It cannot be doubted that the electric disturbance which precedes or accompanies a thunder-storm has a specific effect on some constitutions. Individuals assert that their sensations warn them of an approaching storm when external indications are altogether wanting, as when in bed at night. I allude above more particularly to those cases in which inordinate fear of thunder and lightning, like other groundless apprehensions, is a manifestation of deranged digestion.

I know a gentleman in whom fear of lightning is so strongly developed that it makes him ill to mention the subject of electricity ; and when a thunder-storm comes on, he is always affected with a copious evolution of gas and other evidences of stomach disturbance. A specific electric agency, as well as fear, appears to act in this case.

fully exaggerated, or grossly distorted. This was exemplified in the following instance, which occurred within my own experience.

The patient was a clergyman, a man of advanced years, and, in most matters, of sound judgment. He had been long an invalid, and, although not aware of it, was plainly dyspeptic. He complained of the constant domination of one thought. It concerned a matter of church discipline, not, as he was obliged to confess, of much real importance : yet suicide, as the only solution of it, was ever present to his mind.

There is a phase of religious despondency the subjects of which are generally of the same sex that from a like cause are frequent victims of insanity. Dyspeptic religious melancholy is common amongst women of educated and sensitive minds ; and it may be asked, why does not a truly consistent Christian education check, rather than induce, this manifestation of disease ? Is it that the dark side of the picture is so much dwelt upon that the dread of retributive justice outweighs, or even effaces, all hopeful contemplations ?

Hypochondriasis very frequently takes a

form which, for obvious reasons, comes more fully than any other to the knowledge of the physician. It is that in which the patient fancies himself the subject of some severe disease or combination of diseases. All medical men are familiar with the difficulty of managing these cases. Active treatment is out of the question, and the prudent practitioner must equally avoid the risk of offending the patient by "making light of his complaints."

One difficulty is, that pain or other uneasiness is often really experienced, for it has already been shown that dyspepsia is the source of morbid sensations in every region of the body. The nicest tact is necessary to reassure, without risking the confidence of the patient. Mental relief is the first step towards a cure, and time is thus gained for the employment of general remedies.

It would be quite useless to attempt many illustrations of a disease, the varieties of which are innumerable. I will, however, give one from the class last considered, and most practical men will remember to have met such a case.

The patient is a tall, thin man, unmarried, and of middle age. Possessed of a cultivated mind, he expresses himself fluently and well, both in conversation and in writing. He has proved this in former consultations and in letters, by graphic descriptions of his sufferings. He is an agreeable, and can be a most amusing, companion. No one casually meeting him in society could suppose that he laboured under any secret grief or physical suffering. But the man is in reality most unhappy. When alone, his thoughts are constantly fixed on himself; he notices and mentally records all his sensations. At one time he fancies that he has disease of the heart, at another of the lungs, then of the liver or of the kidneys. Sometimes, in despair of being able to fix on any particular organ, he concludes they must be all in fault—that, in fact, he has a complication of the gravest disorders. Yet he has been assured by various eminent physicians and surgeons that all his organs are sound. He reiterates his mournful tale and puzzles sorely by asking questions in rapid succession. “How do you account for this?” and “How do you

account for that ?" follow every fresh statement. Still there is an air of mystery about the patient ; he has evidently something else to say, regarding which he feels diffident. At length it comes out that, caught by a class of advertisements too well known to need description, he was lately induced to read a certain publication. From that hour his wretchedness has been greatly increased. With bitter remorse he now attributes all his ills to habits of indiscretion, not merely long abandoned, but almost blotted from memory. He has become a perfect self-tormentor.

It requires patience to listen to the entire story, while he repeats an account of his sensations and details his unhappy thoughts. He states that, before seeing the publication in question, he was ignorant of the cause of his ailments, which is now too plain to him. In accordance, as he supposes, with his late views, he dwells, as a matter of especial importance, on a sensation of heat and unpleasantness in the urethra. It seems as if something existed there which ought to come away ; yet he passes over other symptoms until questioned. We

find that he has occasional uneasiness of the stomach—that his tongue is foul and his mouth clammy in the morning. Sometimes he scarcely eats anything ; at other times he eats heartily, but with little appetite. He is much troubled with constipation of the bowels ; the fæces are generally very dark, and have an unnaturally offensive smell.

Sometimes, in a case like the present, the patient altogether refuses to take his digestive organs into account, and the chance of successful treatment is thereby greatly diminished.

## CHAPTER V.

### HABITUAL DYSPEPSIA (*continued.*)

NEITHER the list of symptoms nor the varieties of dyspepsia have been exhausted in the preceding pages; and some of those which are either of less frequent occurrence, or come less within my present scope, shall be next described.

That is a grave form of dyspepsia in which vomiting is a leading feature, and in which the vomited fluids contain the peculiar vegetable organisms *Sarcinæ ventriculi*. Cases in which they occur are too often complicated with organic disease of the stomach. *Sarcinæ* have been supposed to be always associated with enlargement of the stomach; but in one case which ended fatally I found the stomach to be unusually small.\* Nothing peculiar has been

\* Medical Times and Gazette, Nov. 14, 1854.

determined in the fermentation which accompanies *sarcinæ*; nor does fermentation appear essential to their development. The common yeast plants, *torulæ cerevesiæ*, are sometimes found along with them. The vomiting in cases in which *sarcinæ* exist is generally remarkable; it occurs in gushes almost without a strain or effort. The vomited matters are of a dark brown colour, and often in a state of active fermentation, which continues for a considerable time after their ejection. These circumstances are generally sufficient to indicate the existence of parasites, before it has been proved by the microscope.

We meet occasionally with the following singular kind of dyspepsia:—

Dry food produces little or no uneasiness, but taking even a moderate quantity of fluid is followed by distressing results. There is a feeling of fulness or oppression in the stomach, sometimes accompanied by pain; gas is evolved, and the mouth becomes hot and dry. A splashing sensation is felt in the stomach long afterwards, on any quick movement, and especially when lying down. If an observer

places one hand over the cardiac extremity of the patient's stomach, while a few quick strokes are given with the fingers of the other hand on the corresponding part of the body on the right, the splashing will also be felt. It is needless to remark that the same effect would be experienced in the healthy stomach, immediately after drinking freely ; but fluids are then rapidly absorbed. This intolerance of liquids too often indicates serious disease. Some time since I was consulted by a gentleman in whom it was very marked; he expressed surprise that liquids distressed him much more than solid food, and that a simple glass of water produced "wind" and other unpleasant symptoms. He died afterwards of organic disease of the stomach. We may frequently observe modifications of this kind of dyspepsia. Patients say that slop and soup diet does not agree with them nearly so well as a mutton chop or some equivalent solid. Liquid diet has been too indiscriminately recommended for dyspeptics by some authors.

There is an affection of the empty stomach, the subjects of which are usually persons

exhausted by excessive mental exertion, or depressed by severe affliction. Agonizing pain, much resembling cramp, suddenly comes on ; and marked tenderness at the pit of the stomach, coldness of surface, failure of pulse and other indications of general collapse, accompany it. The intermittent nature of the attacks is remarkable ; and during the intervals, which are of very uncertain length, the appetite and digestion are in some cases unaffected.

Delicate people often complain of a " sinking sensation " in the stomach when empty, accompanied by a feeling of general exhaustion. If, as usually happens, these symptoms come on during the night, complete sleeplessness ensues, and the feet become unnaturally cold. Much distressing wakefulness is due to this unsuspected cause ; the sensation referred to has no resemblance to hunger, and yet a biscuit and glass of sherry or a draught of porter will often cause sleep more promptly and beneficially than an opiate.

Another stomach sensation is experienced on the day succeeding an unaccustomed indulgence

in wine or other stimulants, especially if various kinds have been taken: some describe it as a feeling of "rawness," others of heat; and soda water, or other cooling draught, is eagerly swallowed. There is no appetite for food, and if taken in the usual quantity, dyspepsia is experienced. In these cases the gastric surface suffers direct injury, as Dr. Beaumont's account of the appearance of Alexis St. Martin's stomach under such circumstances has clearly proved. This sensibility to injury becomes lessened by repetition, and sometimes a false sense of security results. Sooner or later, however, habitual indulgence in intoxicating drinks leads to the worst results, as shown by a flabby and tremulous condition of the tongue, irregularity of the bowels, complete want of appetite, and great irritability of the stomach.

Our knowledge of intestinal digestion is as yet very limited; and intestinal dyspepsia is consequently less understood than that which has its seat in the stomach. As compared with the stomach, the bowels are characterised by much greater sensibility: this is exactly what might be expected, since the one is a

receptacle for crude substances, while the other is intended to receive them only after their conversion into a bland fluid. The passage of food imperfectly reduced by the stomach, over the intestinal mucous surface, causes pain and other distress, and convulsions not uncommonly in children. The connexion between the nerves of sensation and motion and the network of the sympathetic system of nerves surrounding the bowels explains this. As, however, intestinal dyspepsia may be due to a defect in the digestive fluids proper to the small intestine, it must be considered independently of gastric dyspepsia. Some forms of stomach dyspepsia are more frequently associated with that of the intestines than others : that which I have described as foul dyspepsia is especially the cause of intestinal trouble. The imperfectly digested semi-putrescent aliment frets the sensitive surface of the bowels, and a salutary diarrhoea is excited, just as in the case of the stomach vomiting occurs. In that form of dyspepsia in which mental symptoms preponderate, the bowels are usually at fault ; obstinate constipation is a

common symptom, and also a very dark colour and an unnatural odour of the fæces.

The symptoms of intestinal dyspepsia are not always distinct. One great source of confusion arises from its frequent complication with the stomach affection. The lower position in the abdomen to which the suffering is referred, is an indication not to be neglected. We have generally another clue in the time at which the symptoms come on ; the intestinal distress begins when that of the stomach has subsided ; that is, when the chyme is transmitted from the stomach into the intestines.

There are many reasons for concluding that disorders of the duodenum are capable of distinct recognition. One is, that the track of this part of the small intestine, beneath the cartilages of the right ribs, is the frequent seat of tenderness and pain. Many dyspeptics experience acute pain and rigors at the time when the contents of the stomach are passing into the duodenum. Its sympathies are also remarkable ; a common result of fatal burns is ulceration of its mucous surface. The so-called bilious headache, " blacks before the

eyes," nausea, and, in short, the combination of symptoms known as biliousness, is more referrible to the duodenum than to the stomach.

Acute pain is more characteristic of intestinal than of gastric dyspepsia; faintness, cold perspiration, and shiverings are also more commonly present. The rumbling and twisting sensation in the region of the navel, described by patients, distinctly belongs to the small intestines. The last symptoms are sometimes accompanied by great but transient tenderness, which is generally relieved by pressure or by friction, and the absence of inflammation is also thus determined.

A burning sensation at the anus when fæces are being passed—sometimes compared to the effect of melted lead, or scalding water—is a frequent result of intestinal dyspepsia. It is a favourable symptom, since it shows that certain acrid secretions are being expelled, and is usually followed by relief of pain and flatulence. One of the best examples of dyspepsia attributable to both stomach and bowels, is that accompanied by the kind of diarrhœa in which the aliment is passed almost un-

changed from the bowels. An unnatural irritability of the alimentary tube, which causes the food to traverse it too quickly, is here concerned, and probably a defect in the solvent fluids as well.

## CHAPTER VI.

### THE TREATMENT OF DYSPEPSIA BY DIET.

IN the treatment of every variety of dyspepsia proper diet is, above all things, necessary; but in discussing this matter, the repetition of self-evident truths must be avoided. On the other hand, a great mistake would be committed by being too general, and certain indispensable rules and particulars must be concisely laid down. I promise not to afflict my readers with the story of the famous Cornaro,\* nor to occupy time in useless details.

Attention to diet is so essential that we must be despotic on the subject, as half measures rarely succeed. It is obvious that great judg-

\* The noble Venetian's life and experience may be profitably read *in extenso*. But they have been quoted by writers on dyspepsia *usque ad nauseam*.

ment and due consideration are required in each individual case; and even when these have been fully exercised, the grand difficulty remains of having our advice strictly carried out. It is easier to have any amount of medicine swallowed, no matter how nauseous, than to insure perseverance in a course of diet. Not only are good preliminary reasons necessary, but the patient becomes discontented if the desired results do not immediately follow. But while full co-operation with the medical adviser is necessary, something must be left to the discretion of the patient, since even in health no general rules apply; for, as already said, the requisite quantity of food varies with the period of life, constitution, and habits of the individual, as well as with other conditions. In quantity is also involved quality, as a much smaller amount of one kind of food will satisfy the appetite than of another.

The plan of this work allows no scope for considering the nature of food in general. But the kind of food to be selected by the invalid, as well as the time of taking and the mode of preparing it, claim special attention.

**BREAKFAST.**—After the long interval which has elapsed since the last meal, even the dyspeptic stomach is usually empty in the morning. Nevertheless, keen appetite is seldom felt, and too often nothing substantial is taken until dinner. This is an evil which much needs correction.

The waste of the fluids of the body during the night, makes drinking at breakfast a necessity, but too large a proportion of tea or other beverage spoils the appetite for substantial food and interferes with its digestion. One large cup, or a cup and a half of fluid will be sufficient. Good black tea, not too strong, agrees well with most people, but a few find coffee preferable. Chocolate is not to be recommended, but cocoa, properly prepared, suits some stomachs. Barley-water or thin gruel may be substituted with great advantage, in cases where it is desirable to give a more nutritious drink, and when the nervous system is unusually excitable. These liquids are apt to disagree, however, in cases in which acidity prevails.

The bread used by the dyspeptic should be of the purest kind, and should never be eaten

new. Bread containing bran, is wholesome, and is sometimes very useful in regulating the bowels, but is not suitable in cases in which the mucous membrane of the stomach is irritable as indicated by pain and tenderness. Dry toast is best adapted for these cases, and also for those characterised by acidity.

The practice of eating hot buttered toast, muffin or other greasy preparation, cannot be too highly censured. The oily part separates in the stomach, and floating about, gives rise to heartburn and other mischief. Butter should always be used cold, and rather sparingly, while in some cases it must be interdicted. The yolk of egg when not too much done, generally agrees; the white is less digestible.

In this country certain articles of food have come to be especially used at breakfast. Toasted bacon, fish prepared by different modes of drying, marmalade, &c., belong to the morning meal. In health these articles are unobjectionable, but the dyspeptic stomach will rarely be found capable of digesting them. Even toasted bacon, which is sometimes regarded as a "cure for indigestion," if fat, is

too oily, and, if lean, too hard of digestion to sit easily on the stomach.

When a sense of fulness and other uneasy sensations already described, are only experienced after dinner,\* less food should be taken at that meal, and the deficiency should be made up at breakfast. The principle to be kept in view is this, to apportion the amount of food necessary to sustain the body, more evenly over the waking hours than is commonly done. A great fault in the dietetic system of this country consists in the fact that most people are supported mainly by dinner. The meal is consequently too large, and from this unsuspected cause much dyspeptic suffering results. If man were strictly a carnivorous animal, he might satisfy the cravings of hunger, and maintain his health by a single daily meal. If man were strictly an herbivorous animal he would be impelled to eat more constantly than his present constitution ever disposes him to do. Analogy and reason teach us that he blends the nature of both classes, and therefore the intervals between taking food

\* See page 23.

should be neither so long as in the one case, nor so short as in the other. The dyspeptic patient should take something substantial and nourishing for breakfast. Nothing answers the purpose better than a mutton chop carefully broiled—not fried—and eaten hot. It will of course be proper to vary this, or the patient would tire of its sameness. Cold roast beef or mutton agrees well with a few, but most persons find them heavy. Any of the digestible meats, as game or poultry, and occasionally fresh fish, may be tried, only let the patient bear the principle in mind. The effect will be a more moderate dinner and a diminished stress upon the stomach, with accompanying good results.

No dietetic rule is of more importance than this, yet, simple as it appears, it is not one easy to enforce. Patients persist in saying, "I can never eat breakfast." The fact is, the habit of eating largely at dinner has so grown upon them that they are virtually supported by that single meal, and have no appetite for substantial food at other times. Let the quantity taken at dinner be resolutely diminished, and

breakfast will soon be appreciated. Most dyspeptics digest with greater ease animal food taken at breakfast than at dinner. I have often found this notably the case with reference to the same quantities at both meals. Not only is digestion better performed soon after the repose of the night, than when the nervous energies are more or less exhausted, but, owing to the early replenishment of the blood, gastric juice of better quality will be provided for the digestion of dinner.

The time for breakfast must vary with the individual case. On rising from bed, appetite is often completely wanting, yet the feeble stomach should not be allowed to remain long without refreshment. It will be sometimes proper, especially should the patient rise early, to take only a small cup of tea or coffee, with a biscuit and a little dry toast, immediately on getting up. If circumstances admit of it, gentle exercise out of doors may then be taken, and, after an hour or two, the solid breakfast as already recommended.

LUNCHEON.—Should the invalid adopt the plan just described of having slight refresh-

ment on rising, and a substantial meal afterwards, luncheon will seldom be required, unless he dines very late. In any case luncheon should always be of the lightest nature—something to stay, but not to satisfy the appetite—a rusk or biscuit; and should debility be felt, a glass of sherry or malt drink may be added. The natural action of the human stomach is intermittent, and the organ when properly charged with aliment should be allowed to dispose of its contents before any addition is made to them. The usual interval between our meals, which might appear arbitrary, is founded on physiological principles. In health the period of gastric digestion varies with the constitution of the individual, as well as the amount of exercise and the nature of food; but from four to six hours may be taken as its average duration.

DINNER.—The time for this meal must be regulated by circumstances. If a substantial breakfast is made at nine or ten o'clock, three or four in the afternoon would be the natural time for dinner. But the effect of habit in this matter must not be set aside.

In this country, the time of the principal meal has a wide range, from one o'clock with the lower and a portion of the middle classes, to the aristocratic hours of seven or eight. There is an obvious adaptation in this. Early dinners are adopted by those whose hours of rising from, and retiring to rest are early: late dinners are associated with late rising, and are suitable for those by whom, for purposes of pleasure or business, night is turned into day. In the latter case the inconvenience of going to rest with a full stomach is not experienced. It is also to be remembered that while the time of digestion varies even in health, it is apt to be prolonged by disease, and no greater mistake could be made than that one meal should be heaped upon another in the stomach. Breakfast and dinner should always include the chief sustenance of the invalid. As a rule, plain cooking is best. Generally speaking, the dyspeptic should dine off one, or at most, two dishes, and roast or broiled meat is most suitable. In some cases good mealy potatoes agree well, but in the greater number bread should be the staple. Vegetables of the finer kind are

not inadmissible, but in some instances any succulent vegetable induces flatulence. Cheese or pastry should not be eaten; but light farinaceous puddings seldom disagree, except in acid dyspepsia, when they are apt to increase acidity. Simplicity of diet is especially necessary for persons troubled with foul digestion—those who complain of repeated “bilious attacks.”

There are other cases in which simplicity is undesirable. Here habit again steps in, and is not to be disregarded. Persons long accustomed to live luxuriously can ill bear the change to plain diet. Sometimes delicate and varied dishes are better suited to a stomach unused to plain viands. A small quantity of soup excites the digestive powers, this followed by a little fish, some light meat, all cooked *secundum artem*, form a dinner more easily digested than the same amount of simple roast beef or mutton. It is never to be forgotten that the quantity of food taken is quite as essential a consideration as its kind or quality.

It has been much debated whether drinking

at meals promotes or retards digestion. Dry meals have even been recommended to dyspeptics. But experience proves that a moderate quantity of fluid is salutary. Indeed, the very dilution of the gastric juice that has been so much dreaded by some authorities, is now supposed to aid digestion. The beverage taken at dinner, must, however, be regulated by several circumstances. Practice and theory alike teach us that to distend the stomach with fluid immediately before a meal is highly unfavourable to its action on the food. As before observed, a moderate quantity of fluid taken during a meal is rather beneficial than otherwise, and that quantity must, in a great degree, be regulated by the kind of food eaten. Animal food requires more than vegetable; roasted or baked, more than boiled meat. Made dishes, on account of the spices and othercondiments which they contain, causethirst. The exact quantity of fluid is more difficult to fix than the quantity of food. The dyspeptic must, to a great extent use his own discretion in the matter; but, as a rule, a tumblerful of liquid at dinner should not be exceeded.

TEA.—In dyspepsia with mental disturbance, nervous depression, or wakefulness, tea is inadmissible. But in ordinary cases of slow digestion benefit is often experienced from it, if taken at the proper time and within proper bounds. Three hours after dinner when the food in the stomach has been almost all converted into chyme is the proper time for tea; one or two cups, neither very warm nor sweet may be taken. When acidity prevails, much advantage will be gained by taking tea without sugar. Food at this time is not necessary, but a little dry toast or bread and butter are admissible. Let the dyspeptic, as he values his peace, eschew all hot buttered dainties, however attractive. If coffee be substituted for tea, it should be carefully prepared without boiling, but from the quantity of milk usually taken with it, coffee often causes acidity of stomach.

SUPPER.—The remarks made about luncheon apply equally to supper. It should only be indulged in, if the actual want is felt. When dinner is late, and especially if anything solid has been taken with tea, this can rarely be the

case. As for the hearty convivial meal, it must be abjured by the dyspeptic. When, however, a sense of exhaustion is felt at bedtime, some refreshment is desirable, as it not only strengthens the stomach but conduces to sleep. An egg, a cup of arrowroot or sago, a biscuit and a glass of wine and water, may be appropriate. To be salutary at this time, food must be small in quantity, and the need of it must be distinctly felt. If swallowed without the instinctive want, a restless night or severe headache next morning will be the penalty. A strong reason why supper should be placed under these restrictions is its tendency to interfere with the appetite for breakfast, on the necessity for which so much stress has been laid.

Two dietetic rules should never be lost sight of by the dyspeptic.

1st.—He should always depend on his judgment, rather than on his appetite; and leave off eating when experience tells him that more food would be the cause of trouble to him.

2nd.—When a special disinclination for food

is felt, the usual amount should not be forced down.

We are always accustomed in hospital practice to feed our patients by weight and measure, greatly to their own advantage: in private practice, on the other hand, the management of chronic diseases is sadly interfered with by the indiscretion or indifference of patients in the matter of diet. In dyspepsia, above all other diseases, this difficulty meets us. When dyspeptic patients are told to be moderate in eating, a common reply is, "I eat very little indeed;" against this, a rejoinder is difficult. In such a case, "little" represents an uncertain quantity, and the patient may in reality be swallowing far more food than is good for him. A sense of debility often leads the patient to eat more than he can digest, thus aggravating the evil. Sometimes, however, patients themselves enquire how much food should be taken during the day. These considerations induce me to present the reader with a scale of diet for the dyspeptic. The quantity of food required in health is very variable, and it is of course much more so in a state of disease.

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But in an ordinary case of simple slowness of digestion, the following table would generally be found appropriate, supposing a fair amount of exercise taken.

<i>Breakfast.</i>			
	oz.	oz.	pt.
Bread (stale)	4	<div> <div>Mutton chop, or other meat (cooked), free from fat and skin.....</div> <div>3</div> </div>	<div> <div>Tea or other beverage ...</div> <div><math>\frac{1}{4}</math></div> </div>

<i>Luncheon.</i>			
Bread (stale)	2	.....	Liquid ..... $\frac{1}{4}$

<i>Dinner.</i>			
Bread (stale)	3	<div> <div>Meat (cooked) free from fat and skin.....</div> <div>4</div> </div>	<div> <div>Liquid .....</div> <div><math>\frac{1}{4}</math></div> </div>
Potatoes and other vege- tables .....	4		

<i>Tea or Supper.</i>			
Bread (stale)	2	.....	<div> <div>Tea or other beverage ...</div> <div><math>\frac{1}{4}</math></div> </div>
	<hr/> 15	<hr/> 7	<hr/> 2

This is by no means a strict dietary, but is adapted for that large class of dyspeptics who habitually eat too largely, and if adopted will be a powerful aid towards successful treatment.\*

\* It may be worth stating that the aggregate of a year's consumption of solid food at the above daily rate would be

In the severer forms of dyspepsia, however, as when pain is experienced, a greater diminution of the total amount of food is indispensable. Our practice must, of course, be regulated by the severity of the case; it will frequently be proper to advise the patient to diminish the quantity of his food to one-half, or even less. But the nicest discrimination is necessary: the point to be ascertained is how much food can be digested with comparative freedom from pain, yet to stop short of such privation as would induce debility; it should be always borne in mind that *too great a* diminution of food must, by impairing the blood, lead indirectly to increased dyspeptic mischief.

We must be mainly guided by the sensations of the invalid, on whom should be impressed

within a fraction of four and a-half hundred weights, considerably more than a third of this consisting of flesh. Since the above table was published, I have met the following:—Dra. Christison and MacLagan, in their researches on the diet of prisoners, found that for the average class of persons using moderate exercise, seventeen ounces of solid food is required daily, and that four ounces of this should be nitrogenous. “This will suffice to maintain health, strength, and weight.” Compared with this prison fare for healthy people, the present dietary intended for weak stomachs is on a very liberal scale.

the necessity of avoiding an amount of food previously found to cause suffering. It is true that in bad cases the most moderate quantity causes distress; in other cases, however, the patient is literally a self-tormentor. Sometimes nothing more is necessary to effect a cure than the correction of an alimentary vice—*sublatâ causâ tollitur effectus*. When the digestive organs are defective, it is absolutely necessary to diminish the quantity of food to meet their limited powers. We live by what we digest, not by what we merely eat. An overplus of food is poison to the enfeebled stomach, because it prevents the digestion of even a moderate quantity.

When we have reason to suppose the small intestine to be the seat of dyspepsia, caution in diet is equally necessary. The stomach may remain unaffected, and the appetite unimpaired, and yet the intestines be unfitted to receive the chyme transmitted to them.

Insufficient mastication has been stated to be a common cause of dyspepsia, and mastication must be dwelt upon here as a means of treatment. Let it be impressed on the mind that

the more thoroughly the morsels are chewed, the more easily will they be digested. Animal fibres should be completely loosened by the action of the teeth before swallowing. If the condition of the teeth does not allow of this, the meat should be served pounded or very finely chopped. In the case of bread, and farinaceous food in general, impregnation with saliva is still more essential.

The perfection with which false teeth can now be adapted makes them most useful substitutes for the natural organs, and if requisite, the dyspeptic should not neglect to avail himself of the dentist's art. Let it be remembered, however, that in no instance is economy more futile: badly-fitted teeth only increase the evil they were destined to remedy, and the base metal sometimes employed for their support has been known to affect the health most injuriously.

Regularity in the hours of meals cannot be too strongly insisted upon. The stomach should not be disappointed when it expects to be replenished. If disappointed, either from the action of its own secretions, or from a want of

sustainment in its muscular action, even a diminished amount of food will be taken without appetite, and will be sure to cause bad symptoms. Any changes in the time of meals should be gradually made. In the case of the confirmed invalid, whose meals are all of a light nature, two o'clock in the afternoon is the best hour for dinner, supposing him to have breakfasted at nine in the morning.

The diet generally suitable to the dyspeptic is that which combines most nutriment with least bulk. In health, and especially if much exercise be taken, a certain bulkiness of food is necessary: but in proportion to the degree of dyspepsia concentrated nutriment answers best, the object being to nourish the body without oppressing the digestive organs.

Some of the results of Dr. Beaumont's well-known experiments as to the digestion of different kinds of food on Alexis St. Martin are here appended: they possess great interest in themselves, and may be usefully compared with the results of individual experience.

TABLE SHOWING THE MEAN TIME OF DIGESTION  
OF THE DIFFERENT ARTICLES OF DIET.

Articles of diet.	Mode of Preparation.	Time required for digestion.	
		h.	m.
Rice ... ..	Boiled	1	0
Sago ... ..	Ditto	1	45
Tapioca ... ..	Ditto	2	0
Barley... ..	Ditto	2	0
Milk ... ..	Ditto	2	0
Ditto ... ..	Raw	2	15
Gelatine ... ..	Boiled	2	30
Pigs' feet, soured	Ditto	1	0
Tripe       ,,	Ditto	1	0
Brains... ..	Ditto	1	45
Venison steak	Broiled	1	35
Turkey, domestic	Roasted	2	30
Ditto ... ..	Boiled	2	25
Turkey, wild ...	Roasted	2	18
Goose ... ..	Ditto	2	30
Pig, sucking ...	Ditto	2	30
Liver, beef's, fresh	Broiled	2	0
Lamb, fresh ...	Ditto	2	30
Chicken, full grown...	Fricassee	2	45
Eggs, fresh ...	Hard boiled	3	30
Ditto ,, ... ..	Soft ditto	3	0
Ditto ,, ... ..	Fried	3	30
Ditto ,, ... ..	Roasted	2	15
Ditto ,, ... ..	Raw	2	0
Ditto, whipped	Ditto	1	30
Custard .. ...	Baked	2	45
Codfish, cured, dry	Boiled	2	0
Trout, salmon, fresh	Ditto	1	30
Ditto ditto ...	Fried	1	30
Flounder, fresh	Fried	3	30
Salmon, salted	Boiled	4	0

## 138 TREATMENT OF DYSPEPSIA BY DIET.

Articles of diet.	Mode of Preparation.	Time required for digestion.	
		h.	m.
Oysters, fresh ... ..	Raw	2	55
Ditto „ ... ..	Roasted	3	15
Ditto „ ... ..	Stewed	3	30
Beef, fresh, lean ... ..	Roasted	3	0
Ditto, dry ... ..	Ditto	3	30
Ditto, steak ... ..	Broiled	3	0
Ditto, with salt only ... ..	Boiled	2	45
Ditto, with mustard, &c. ... ..	Ditto	3	30
Ditto, fresh, lean ... ..	Fried	4	0
Ditto, old, hard, salted ... ..	Boiled	4	15
Pork, steak ... ..	Broiled	3	15
Pork, fat and lean ... ..	Roasted	5	15
Ditto, recently salted ... ..	Boiled	4	30
Ditto „ ... ..	Fried	4	15
Ditto „ ... ..	Broiled	3	15
Ditto „ ... ..	Raw	3	0
Ditto „ ... ..	Stewed	3	0
Mutton, fresh ... ..	Roasted	3	15
Ditto „ ... ..	Broiled	3	0
Ditto „ ... ..	Boiled	3	0
Veal, fresh ... ..	Broiled	4	0
Ditto „ ... ..	Fried	4	30
Fowls, domestic ... ..	Boiled	4	0
Ditto „ ... ..	Roasted	4	0
Ducks „ ... ..	Ditto	4	0
Ducks, wild ... ..	Ditto	4	30
Suet, beef, fresh ... ..	Boiled	5	3
Suet, mutton ... ..	Ditto	4	30
Butter ... ..	Melted	3	30
Cheese, old, strong ... ..	Raw	3	30
Soup, beef, vegetables, bread	Boiled	4	0
Ditto, marrow-bones ... ..	Ditto	4	15
Ditto, beans ... ..	Ditto	3	0
Ditto, barley ... ..	Ditto	1	30
Ditto, mutton ... ..	Ditto	3	30
Chicken soup ... ..	Ditto	3	0
Oyster soup ... ..	Ditto	3	30

Articles of diet.	Mode of Preparation.	Time required for digestion.	
		h.	m.
Hash, meat and vegetables...	Warmed	2	30
Sausage, fresh ... ..	Broiled	3	20
Heart, animal ... ..	Fried	4	0
Beans, pod ... ..	Boiled	2	30
Bread, wheaten, fresh ...	Baked	3	30
Ditto, corn ... ..	Ditto	3	15
Cake ,, ... ..	Ditto	3	0
Ditto, sponge... ..	Ditto	2	30
Dumpling, apple ... ..	Boiled	3	0
Apples, sour and hard ...	Raw	2	50
Ditto ,, mellow ... ..	Ditto	2	0
Ditto, sweet ,, ... ..	Ditto	1	30
Parsnips ... ..	Boiled	2	30
Carrot, orange ... ..	Ditto	3	15
Beet ... ..	Ditto	3	45
Turnips, flat ... ..	Ditto	3	30
Potatoes ... ..	Ditto	3	30
Ditto ... ..	Roasted	2	30
Ditto ... ..	Baked	2	30
Cabbage head ... ..	Raw	2	30
Ditto, with vinegar ... ..	Ditto	2	0
Ditto ... ..	Boiled	4	30

This table is only approximately true, since the same kind of food is digested with different degrees of facility, by different individuals; and no account has been taken of various circumstances which influence the digestion of the same articles at different times.

If a chemical action were alone concerned in

digestion, we might tabulate the digestibility of different kinds of food in a very exact manner from experiments. But although we can dissolve albuminous compounds by artificial means, this kind of digestion is imperfect. Complete digestion must be regarded as the result of chemistry *plus* life. There even seems to be a special affinity between the individual living body and the articles destined to repair it; why, otherwise, should mutton, in general the most digestible meat, prove the least so in a few cases,—or, on the other hand, should pork, a most indigestible article, prove in some instances the reverse?

Most of the common alimentary substances are arranged below in three groups. The first contains the articles most suitable for the dyspeptic, the second those only admissible in less severe cases, and the third may be considered a dietetic *Index Expurgatorius*, since few of the articles comprised in it should ever be taken by the invalid, while those to which an asterisk is attached should be regarded by him more in the light of poison than of food.

*First Group.—Articles easy of Digestion.*

Mutton, venison, sweetbread, chicken, rabbit, partridge, pheasant, grouse, beef-tea, mutton broth, milk.

Whiting, smelt, turbot, flounder, sole.

Stale bread, biscuit, rice, tapioca, sago, arrowroot.

Asparagus, seakale, French beans, cauliflower.

Baked apple, oranges, grapes, strawberries.

Toast-water, black tea, Bordeaux and Rhine wines, Amontillado sherry.

*Second Group.—Articles moderately easy of Digestion.*

Beef, lamb, hare, pigeon, turkey, guinea and pea fowl, duck, wild water fowl, blackcock, woodcock, snipe; soups in general, eggs not hard boiled, butter.

Cod, haddock, pike, trout, raw oysters.

Potatoes, turnips, cabbage, spinach, artichoke; raw vegetables, especially lettuce; apples, peaches, apricots, pine-apple, gooseberries, currants, raspberries, mulberries; bread and other farinaceous puddings; jelly, marmalade, rhubarb, and cooked fruits in general.

Cocoa, coffee, malt drinks, Madeira, Burgundy and port wine.

*Third Group.—Articles difficult of Digestion.*

\*Pork, \*veal, goose ; the liver, heart, kidney, and brains of animals ; salt meat, sausage, \*hashed or \*stewed meats.

\*Mackerel, eels, salmon, herring, sprat, skate, sturgeon, salted fish in general, lobster, crab, prawns, shrimps, cray fish, \*mussels, cockles, scallops, and oysters, cooked.

Salad oil, melted butter, hard-boiled eggs, cheese ; new bread, \*muffins, and buttered toast ; \*pastry in general, \*suet puddings, pancake, custards.

\*Nuts of all kinds, pears, plums, cherries, dried fruits ; \*raw cucumber, beetroot, Jerusalem artichoke, onion, carrot, parsnip, peas beans, mushrooms, pickles.

Chocolate, champagne, liqueurs.

Certain generalities connected with diet may be appropriately introduced here :—

Hot meat is more digestible than cold.

The flesh of young animals is less easily digested than that of full-grown animals.

The flesh of wild animals is more digestible than that of domestic animals.

The flesh of animals killed by hunting is more digestible than of such as have been shot.

Land birds are more digestible than water-fowl.

Of game, the long-billed birds are less digestible than other kinds.

The white parts of the flesh of certain birds are more digestible than the dark.

The visceral parts of animals, as liver, heart, kidneys, are indigestible; but the sweetbread is an exception.

White-fleshed fish are more digestible than the red-fleshed.

Fish containing much oil, as the eel, mackerel, &c., are difficult of digestion; and so are shell-fish in general.

Fat is in general obnoxious to the dyspeptic, but while the lean of meat is rendered less digestible by salting, the reverse is true of the fat: hence the fat of bacon broiled is not only

easy of digestion, but has obtained a reputation in the treatment of dyspepsia.

Olive and other vegetable oils are difficult of digestion; but cod-liver oil, and perhaps other animal oils are not. Oily fish is very injurious, on account of the empyreuma and other changes effected in the oil by cooking. For the same reasons, butter or lard used in frying, is often objectionable; uncooked is better than melted butter.

Man has been appropriately defined as a "cooking animal," and it is certain that his digestion greatly depends on culinary art. A good cook is, therefore, invaluable to the dyspeptic. Before cooking meat, sufficient time should always elapse, as its tenderness is thereby greatly increased; but high meat or game should be scrupulously avoided. Of the ordinary modes of cookery, broiling is best, roasting next, while frying and baking are the worst. Meat cooked in the French style agrees much better with many stomachs than the substantial underdone condition in which it is commonly served in this country.

Hashes, stews, and rich made dishes are

especially productive of foul dyspepsia. In this affection simplicity of diet should be especially studied. Vegetable is generally less easy of digestion than animal food; many vegetables, as peas, beans, cabbage, are very productive of gas, owing to their tendency to ferment—a circumstance taken advantage of by the Germans in the preparation of *sauerkraut*. Although salads are seldom admissible in dyspepsia raw vegetables are not so injurious as is generally supposed;—they are frequently blamed for what is really the effect of the oil used with them. The patient should carefully avoid swallowing the skin, core, and kernels of all fruit. I have known dyspepsia greatly aggravated and apparently even induced by eating pears, which in their ripest state contain an abundance of gritty material, which, as it cannot be separated in the mouth, irritates the digestive mucous membrane.

In dyspepsia with acidity, vegetables, fruit, and even farinaceous food, are especially likely to disagree; and the two first should either be abstained from altogether, or very sparingly taken now and then in an experimental way.

With farinaceous food the case is different. Bread in some form is an indispensable article of diet, and it is therefore important that it should be of the best quality, and adapted as much as possible to the invalid. Unfermented bread, which is now to be commonly had in London, certainly agrees better with some dyspeptics than the ordinary kind; but, on the contrary, others find it heavy and disagreeable. The bread taken by the invalid should always be two days old, and toasting diminishes its liability to become sour in the stomach.

In bad cases of acidity, great advantage will be gained by substituting simple flour biscuit for bread.

If there is one thing which disagrees more than any other with all dyspeptics, it is pastry—with which may be classed sweetmeats of all kinds.

Sugar should be used sparingly in all forms of dyspepsia, but in that attended with acidity should be altogether abstained from. Sugar added to acid things conceals but does not destroy acidity. Many suppose that an acid

tart loses its noxious qualities by being impregnated with sugar, but this is a great mistake. Those also who are anxious to reduce their fat should avoid sugar.

In painful dyspepsia farinaceous substances are usually our main dependence. Preparations of arrowroot or sago, &c., may sometimes be taken without inconvenience, when the smallest portion of meat would be the cause of dire suffering.

Although there are remarkable exceptions, broths, and fluid nourishment in general, are adapted to a large proportion of severe cases. As milk contains all the materials of the body, it is one of the best forms of liquid diet; but unfortunately it frequently disagrees with the delicate stomach. Milk when boiled sometimes agrees better than raw. Good black tea, not too strong, with little milk or sugar, is generally unobjectionable. Coffee is more apt to produce acidity, and the same observation may be made of cocoa. Chocolate as usually prepared is inadmissible, on account of the quantity of vegetable oil which it contains.\*

\* A patent preparation from cocoa, called cocoatina, of

Except in painful digestion, spices and condiments used in moderation generally do no harm. Mustard and pepper are useful in slow digestion : hence Cayenne pepper has long been an ingredient in dinner pills. Vinegar aids the digestion of many substances, and I have been told by patients that they found it a good preventive of "biliousness." Salt is the natural relish, being indispensable to health.

In a large proportion of cases, water alone should be the habitual drink ; its quality is therefore of great importance. Some persons are so susceptible of the qualities of this element, that they experience derangement of the digestive organs if circumstances oblige them to drink water to which they are unaccustomed. Various earthy salts, especially sulphate of lime, are common impurities.

There is considerable difference of opinion as to whether stimulants should be taken in dyspepsia ; which seems to have arisen from

great purity, and free from oil, may be ordered at any chemist's or Italian warehouse. It makes an excellent beverage for the dyspeptic.

not sufficiently discriminating their varieties as well as those of the disease itself. My own experience in this matter is as follows:—Bordeaux wine of good quality and medium natural strength—not brandied—such as may now be had at a moderate price, is the least objectionable stimulant in all forms of dyspepsia. In the majority of cases, a couple of glasses with dinner is very advantageous—cleaning the palate and increasing appetite and digestion.\* So far from being hurtful, as many suppose; its acidity has much to do with these results. Yet claret does not cause undue sourness of the contents of the stomach, and it is the best wine for those having gouty tendencies.

In some cases of slow digestion, light sherries, as Amontillado and Manzanilla, will answer best. The contractions of the flabby stomach are better promoted by these wines,

\* Dr. Druitt, in his admirable work on Wine, says—“One thing that would go with the greater use of Bordeaux wine would be the custom of drinking it in its proper place *during dinner*, as a refreshing and appetizing draught, to entice the languid palate to demand an additional slice of mutton.”—Report on Cheap Wines, p. 42. Renshaw, 1865.

while any tendency to fermentation in its contents is checked.

In digestion with acidity, weak brandy-and-water is frequently appropriate; but in some cases it adds to the symptom in question.

In painful digestion, weak wines of the Bordeaux kind are alone admissible; as in many cases any stronger stimulant severely aggravates the disease. For the painful affections of the empty stomach brandy is useful, and the patient has recourse to it intuitively.

In foul digestion stimulants are as likely to do harm as good, and care should be taken not to take a mixture of different kinds.

In dyspepsia in which mental symptoms predominate, a fair allowance of generous wine is often but not always useful. The nervous energy and circulation of the patient are usually below par, and they, as well as the stomach, require stimulation. Good port suits a few patients; but there are many to whom it is very injurious, and in some cases a glass taken with food completely disturbs digestion. Effervescing wines are as a rule very injurious. They give rise to fermentation, owing to

the process not having been previously completed in the wine itself. The dyspeptic not infrequently experiences for some days an aggravation of symptoms, or else a sense of general depression from a single indulgence in champagne.

It may be remarked of spirits that brandy has astringent properties, so that many complain that it makes their skin hot and dry. Whisky has the contrary tendency, and sometimes causes perspiration ; while gin is decidedly diuretic.

Malt drinks are inadmissible in a large proportion of cases, but they combine nutritive with stimulating properties, and, when they agree, are useful in sustaining the strength between breakfast and a late dinner. A glass of good ale or porter, with a biscuit, often acts as a substitute for substantial food, when the object is to avoid overloading the stomach. Care should, however, be taken at other times that the satisfying qualities of malt drink are not allowed to take the place of solid food.\*

\* General experience shows that the malt drinks best adapted to the delicate stomach are, of the lighter kinds, the bitter ales of Allsop and Bass, and of the heavier, the so-called XX of Guinness.

## CHAPTER VII.

### THE HYGIENIC TREATMENT OF DYSPEPSIA.

IN all dyspeptic cases much benefit is derived from attention to the state of the skin. The frequent use of the tepid bath, and of a hard brush and soap to free the choked-up pores, are very salutary.

When available, the Turkish bath, for the introduction of which this country is indebted to Mr. Urquhart, presents a means of cleansing the skin altogether superior to any other. No one who had not witnessed it, could imagine that so much *débris* could be removed from a skin apparently clean, as by the processes of the bath. The *débris* consists of the minute scaly or epithelial covering of the integument, which adheres unduly when perspiration is seldom induced and the surface is constantly covered. This relieves the pores so remarkably, that perspiration is effected far more easily in those who are accustomed to the bath than

in others. The cold douche or cold plunge, on account of their bracing effects, should always be taken after the bath.

No remedy is more valuable in the treatment of dyspepsia than the cold bath, yet it is difficult to explain its immediate action, except by a sympathy existing between the skin and the mucous membranes. Most people are familiar with the quick increase of appetite after a sea-bath; but even the dyspeptic patient, long a stranger to the sensation of hunger, will sometimes experience it after the cold bath, and digest without difficulty what at another time would have caused distress. It must never be forgotten, however, that the success of all bathing depends on the completeness of the subsequent reaction. If the patient feels cold and uncomfortable after bathing, harm, and not good, has been done; the matter, therefore, requires the medical attendant's close attention.

Sea-bathing is best adapted for those who are at least moderately robust, and can endure without chill a limited exposure to the open air. The effect of the wind during transit into and out of the water is sometimes objectionable, and even the discomfort of dressing in a bathing-

machine may be injurious, by delaying or altogether preventing salutary reaction. Another question is the time at which the sea-bath should be taken. A common impression prevails that all bathing is best before breakfast. Those who are sufficiently robust may bathe and subsequently enjoy breakfast, but for those less strong I am decidedly opposed to the plan. As a rule, the best time for the sea-bath of the dyspeptic is about noon, when the stomach is sufficiently empty, and the action of the sun has cleared away all sea-mists. The bath should never be prolonged, and exercise should be taken immediately after, to encourage the glow of heat and the pleasurable sensations characteristic of complete reaction.

When the patient is very delicate, bathing in the house is preferable, and it has the advantage of being available in every locality and season. Immersion of the whole body, the shower and sponge baths, may be regarded as degrees suitable in different cases. Total immersion in water at the temperature of the air, or lower in summer, ranks next to sea-bathing; next follows the shower bath, and for

those too delicate for either, the sponge bath is the substitute. In using the shower bath it is often useful to protect the head from the shock ; and it must be remembered that, in addition to the action of cold, there is in this mode of bathing a stimulating effect unsuited to some constitutions.

In all cases of bathing in the house, brisk rubbing with coarse towels should be practised for some minutes as a substitute for exercise. When the weather is damp or cold, this rubbing, as well as dressing, should be done in a well-warmed room.

To ensure good digestion sufficient exercise is absolutely necessary ; exercise improves the digestive secretions, by improving the general health. Moreover, the necessary movements of the alimentary tube greatly depend on exercise of the voluntary muscles. I have frequently proved by experiment, that if a person lie extended on his back, the heart's action will be quickened by the slight elevation of a single limb. This shows the close connexion between the voluntary and involuntary muscular systems, and how the contractile motions of the

stomach and intestines are likely to be influenced by bodily movements.

Exercise is necessary for health, because it promotes renewal of the tissues—in other words, the processes of waste and of repair. Men who use great muscular exertion eat more than those who live at ease, and every one is conscious of increase of appetite after a single day's exercise, if it has been preceded by a period of sedentary occupation. Out-door exercise is incomparably best, and the invalid should remain in the open air at least two hours daily. The weather must not be allowed to interfere too much with this rule, but be met by appropriate clothing. There is far more danger to be feared for the dyspeptic in sedentary habits than in a little increase of damp or cold, when properly encountered. A broad belt of flannel should be worn round the abdomen if the bowels are susceptible. The kind of exercise must be adapted to the character and intensity of the case, but should stop short of fatigue. In severe cases passive exercise in a boat or open carriage is best; but for those who are stronger, walking at a

sufficiently quick rate to produce a glow of heat is highly beneficial. Riding on horseback is the exercise most generally useful to the dyspeptic. There is much benefit in the rapid change of air,—in the abstraction of mind, owing to the unconscious attention bestowed on the horse, and the sense of easy, independent action which horse-exercise gives. But the benefit is largely due to the particular effect on the digestive viscera themselves. Their peristaltic movements are stimulated, and the abdominal muscles made to act on them in a continuous and peculiar manner. For these last reasons, digging is an exercise which those who are fond of gardening will find salutary, as well as agreeable.

Those who are sufficiently robust will be greatly benefited by athletic exercises, as rowing, cricketing, and field sports in general.

When the weather entirely forbids going out, there are many exercises which can be beneficially used in-doors. Walking up and down a large room is sufficient for some; while fencing, sparring, dumb-bells, &c., may be resorted to by another class of invalids. Persons of seden-

tary habits should avoid stooping, and, in particular, any pressure against the stomach. In the occupations of the office, standing at a desk of sufficient height to prevent stooping should alternate with sitting.

Ought dyspeptics to exercise before breakfast? Not without at least taking some refreshment. Yet, as in the case of bathing, the contrary opinion is sometimes held. What has been termed the hardening system has its advantages, but if indiscriminately employed, proves very injurious. People of robust habit may increase appetite and digestion by morning exercise before taking food; but, from the same cause, less vigorous persons generally lose their relish for it, and experience discomfort if they persist in swallowing the usual amount.

The best time for active exertion of either body or mind is the interval between breakfast and dinner; that is, when the digested food begins to be absorbed into the blood, and all the functions are stimulated and refreshed. But let this precept not be forgotten: much mental or bodily fatigue is the worst possible preparation for the principal meal. The man

of letters should not sit down to dinner exhausted by his labours, nor should the man of business, who lives in the suburbs of a great city, do so over-tired by a long and hurried walk from his chambers or his counting-house. After dinner from one to two hours should always elapse before any real exertion of mind or of body is undertaken.

The dyspeptic should sleep on a hair mattress, and his covering should only suffice to ensure proper warmth. The period of sleep should be regulated by his requirements, but eight hours appears the natural adult proportion. Lying late in bed in the morning, without sufficient cause, is very enervating, and is to be guarded against, because indisposition to rise is a constant attendant on dyspepsia. The practice of breakfasting in bed, unless absolutely required on account of debility, cannot be too strongly condemned.

The evil effects of an impure atmosphere have been dwelt upon: it is only necessary here to insist on the necessity of good ventilation, especially where gas is used. Bed-rooms, where so much of life is passed, should be large

and lofty, and always have free communication with the outer air. What has been said of smoking and taking snuff in excess as causes of dyspepsia, proves, that to ensure successful treatment, these habits must be moderated, if not abandoned. Let it be remembered that in these instances excess is altogether relative to the effects produced on the individual.

The beneficial effects of change of place are so well known, that little need be said to recommend it. Some subtle influence for good, quite independent of climate in its ordinary sense, is connected with it; but much is attributable to mental causes. The close relation between the stomach and the brain makes it necessary that in bad cases perfect rest be given to the brain, and, if possible, that the whole current of thought be changed. This can be effected best by change of place and outward association. There is something in travelling calculated to take a man out of himself, and to lessen his self-consciousness. Some men, it is true, carry everywhere with them their own moral and social atmosphere—live in their own narrow circle of thought and feeling, are attended by

all their cares, no matter what the climate or what the associations ;\* but such instances are, happily, rare.

For the reasons assigned, travelling is especially desirable for the hypochondriac.

In change of residence, climate should be a chief consideration. According to my experience, most cases of dyspepsia are benefited by a cool and bracing atmosphere. The uncomplicated disease is here spoken of; for where the lungs are concerned, we must in our selection generally give these organs precedence, and a moister and warmer atmosphere may be desirable. If gastritis is present, that must claim priority; the latter kind of climate will be suitable, and so in other cases. But there are many reasons why for dyspepsia cold is generally to be preferred to heat. Appetite is greatly influenced by temperature, cold being more conducive to it than heat; while exercise, so necessary for the dyspeptic, can be taken

\* "*Scandit æratas vitiosa naves  
Cura : nec turma equitum relinquit :  
Ocior cervis, et agente nimbos  
Ocior Euro.*"

with greater ease in cold than in warm weather.

A large number of patients will derive benefit from a systematic disregard of everyday comforts, and extending their rambles beyond the reach of railways and luxurious accommodation. Let him who is not afraid of "roughing it," and finds, as he probably will do, that he is capable of the exertion, try the effects of seven or eight hours' daily exposure in the saddle to a bracing atmosphere. Let him who prefers it grasp the alpenstock, and, avoiding extreme fatigue, brace his nerves as well as his muscles in climbing Alpine summits. In such cases difficulties on the score of food will rarely present themselves. Reduced to the coarse fare of the country, the stomach will not only accept with relish, but readily digest that which at home would be rejected with disgust. Good milk can be obtained almost everywhere, and should be the traveller's staple; and this, with biscuits and preserved provisions in case of need, will fulfil all the requirements even of the dyspeptic.

Sweden and Norway present accessible

places of resort where picturesque scenery is combined with a cool summer climate, and where the gun and the fishing-rod can be employed with effect. Those who are not afraid of the sea-voyage should visit Iceland, now brought comparatively within reach by steam communication. There, Nature may be seen in her most rugged aspects, and those astonishing phenomena are presented which cannot fail to excite and to interest the most self-engrossed mind or the most desponding spirit. Let those whose object is economy and less preliminary trouble make such places as the Valley of Chamouni their head-quarters. Situated at the foot of Mont Blanc, Chamouni presents many advantages. So much is residence in an elevated region beginning to be appreciated, that men of the most philosophic minds have assured me that it alone suffices to restore their vigour when exhausted by mental application and sedentary life. They allege that the difference in effect upon health and spirits between such a position and one of ordinary elevation is very marked. Probably lessened atmospheric pressure, and consequent

electric and other changes, may afford the explanation. The Valley of Chamouni is 3,000 feet above the sea level, and from the formation of the mountains has the advantage of free ventilation. All that is rich in verdure and grand in glacier are constantly within view, and from this as his resting-place the traveller may undertake Alpine excursions suitable both to his strength and his purse. The means of reaching Chamouni have been much facilitated of late, and the accommodation improved. It also possesses the advantages of chalybeate and sulphurous waters.\*

The good effects of sea-bathing have been already spoken of, but even residence by the seaside is very salutary. It is a true instinct which causes so many thousands to rush thither in autumn, and so many more thousands to vainly wish to go. Sea-air is in itself most invigorating, and perhaps the ceaseless changes and regular flow of the ocean, joined to the many objects of interest for young and old, learned and unlearned, which the seaside

\* See "Chamonix," station Balnéaire, par le Dr. C. Depraz. 1864.

affords, contribute much to its healthy influence. The inhabitant of a city is there less likely to be oppressed by the monotony of the country, so often complained of as counteracting the good effects of pure air and quiet.

Those moral consolations which are, in many cases, powerful aids to recovery, are next to be considered. But it has been already pointed out that great individual differences exist, and that with one class of patients moral interference is altogether unnecessary.

The task of consoling hypochondriacal sufferers is usually very difficult,\* and always requires nice discrimination. The judicious physician may effect much by assuring the patient of the groundlessness of his fears, or of the over-severity with which he has judged himself, and his mind may be relieved of imaginary terrors or frightful anticipations. It is true, however, that mental relapses are frequent,—that what is believed one hour is

\* The difficulty of giving mental solace is finely expressed in the following passage :—

“ Words are words. I never yet did hear  
That the bruised heart was pierced through the ear.”  
*Othello*, Act I., Sc. 3.

questioned the next, and again altogether doubted. But even temporary remissions give tone, and a facility of resuming a healthy train of thought is acquired by repeated efforts. In this way the advice of the physician is valuable. He should encourage his patient to speak freely, to unburthen his secret grief, and then judgment and discretion must be used in applying the remedy. To treat any statements, however startling or improbable, with levity is seldom judicious. Few, if any, can be laughed out of their fancies, and a passing smile of incredulity would, in many cases, lose for ever the confidence of the patient. Without pitying, he must sympathise : to sensitive minds the pity of a stranger is generally repulsive ; and there are minds so constituted that it is intolerable even from their nearest friends. He must feel with the patient and for him, but the demonstration must be one of manner rather than of words. In approaching the subject of his morbid fancies, we may often find it necessary to expose their fallacies ; but we must do this delicately, and with the assurance that his delusions form part

of his disease, and therefore deserve full consideration. Above all, we must not only avoid exaggeration, but what may seem to the patient in any way to resemble it. Nor must we good-naturedly promise too much, nor too speedy results from treatment. It must be always remembered that the mind of the hypochondriac, though it may be weak and warped in certain directions, generally preserves its full force and clearness in others. The patient is more suspicious than when in health, and as capable of detecting imposition as ever. Confidence is only inspired by truth ; and trust in the medical attendant, always essential, is here indispensable.

## CHAPTER VIII.

### THE USE AND ABUSE OF MEDICINES.

No diseases are more capable of receiving benefit from medicinal agents than disorders of the stomach. In most other diseases the stomach is merely a medium of transmission, while in the present instance our remedies come directly into contact with the affected part. The action of medicines on the stomach may, in this respect, be compared with the effects of external remedies on diseases of the skin, the difference being in favour of the more impressible gastric mucous membrane.

The patient should, however, be always instructed in what is really to be expected from medicines. He should be assured that their efficacy consists rather in rectifying morbid conditions, than in preventing their recurrence.

That recurrence can only be averted by attention to dietetic and hygienic rules, which no medicines can supersede.

As the plan of this work has special reference to dietetic and general treatment, no space is available for such a consideration of the various medicines that may be employed against dyspepsia as their importance demands. The abuse of some medicines leads to the worst consequences, and stress will be laid on such as are most frequently misapplied. Brief notices of other remedies must suffice.

We possess in alkalies a class of medicines which act in the body precisely as they do out of it. In the stomach, or elsewhere, a given quantity of acid is saturated by a proportionate quantity of alkali; from alkalies great advantages are therefore to be derived. But of all our remedies none are more transient in their effects; and we must regard antacids merely as palliatives.

Alkalies are particularly useful in dyspepsia with undue acidity, and a deposition of lithic acid, or lithates, in the urine. But in the other form of the same disorder mineral acids

succeed better.\* By improving the condition of the stomach they act indirectly as antacids, and, if slower in effect, have the advantage of being far more permanent.

The urine should be examined from time to time during a course of alkaline treatment, which should be suspended if phosphates make their appearance.

In the use of alkalies certain differences are observable. Soda is less disagreeable to the taste than potash, and is especially useful when the tongue is furred or coated. Soda seems to exercise a special action on the liver, by which the secretion of bile is increased. It is certain that soda has less action on the kidneys than potash. The carbonates of soda may be given in the form of lozenges as well as in solution.

As far as the stomach is concerned, potash is very similar in its effects to soda; but potash is superior when lithic deposits prevail in the urine. Bicarbonate of potash is to be preferred to the solution of potash, or to that somewhat weaker preparation known as Brandish's alka-

\* See p. 77.

line solution. The caustic properties of potash are so energetic, that the delicate surface of the stomach is exposed to injury should it happen to be insufficiently protected by mucus, or unless enough acid is present to neutralize the alkali. This statement is not made from theory alone, as I have met cases in which the stomach was injured by liquor potassæ taken in large doses.

Magnesia is devoid of caustic or irritant qualities, and is almost tasteless. When in conjunction with acidity there is much irritability of stomach, it will therefore be found preferable to either soda or potash. Its laxative properties are also often advantageous, and its action on the urine is scarcely inferior to that of potash. Magnesia also possesses sedative properties ; it is an efficient remedy in gastrodynia, and is often valuable in combination with bismuth or manganese in cases of dyspepsia with epigastric tenderness. Inconvenience has occasionally arisen from the concretion in the large intestine of magnesia taken continuously in large doses. Dinneford's solution of magnesia in water impregnated with carbonic acid is a

valuable preparation. It is often an effectual remedy for headache and nausea arising from errors of diet, and it is also a useful laxative in the treatment of dyspepsia with foul eructations.

The doses of alkaline medicines should in each case be carefully regulated by observation of their effects in checking acidity. So much only should be taken as from the sensations of the patient seems sufficient. Any excess interferes with digestion by neutralizing the acid of the gastric juice. Here the remark holds good, that it is sometimes more difficult not to pass the goal than to reach it. The best time for taking alkalies is three or four hours after a meal, or when the partially digested food is about to pass into an unnaturally acid condition. In many cases repetition of the alkaline dose seems to increase the tendency to acidity. In others the temporary relief afforded is so much valued by the patient, that alkalies become an absolute want. The dose of soda, or potash, or magnesia is resorted to after every meal. This is particularly to be guarded against. From the influence of habit

larger doses become necessary to produce a given effect. The health is slowly but surely impaired, and a condition of blood resembling that in scurvy sometimes results. In such a case, digestion, instead of being improved, is seriously injured. In a few instances alkalies act upon the system so powerfully, that a state of nervous excitement is produced even by a single dose.

Vegetable bitters are useful in most cases of dyspepsia in which the stomach partakes in a general debility of the system. They are well adapted for the phlegmatic, and for persons of languid circulation; not so much so for the plethoric, and those of the inflammatory tendency. These bitters are highly useful to the debilitated stomachs of those who indulge too freely in alcoholic stimulants. But considerable differences are traceable in the nature and adaptations of this class of medicines.

Strychnia acts not only as a bitter, but possesses other valuable properties in dyspepsia. It need hardly be urged that this energetic drug requires to be cautiously administered, but its effects will amply repay the care. Speak-

ing from extensive experience, I know no single medicine of more value in the present disease. Strychnia is particularly indicated in dyspepsia attended by nervous debility. In that numerous class of cases in which abnormal sensations in various parts of the body—as the throat, the head, or the limbs—are experienced, it will generally be found useful. It is the best tonic for the class in which mental symptoms predominate. But it also possesses excellent local effects, and acts by increasing the tone of the muscular coats of the stomach and intestines. When these coats are relaxed, gases are generated, mainly owing to retardation of the aliment in the cavities. No remedy has in my hands proved so permanently effectual as strychnia against this inconvenience. In the case of a gentleman who suffered most severely from sudden and almost daily accumulations of gas in the stomach and bowels, the attacks were attended by great mental oppression; often by fits of crying. The symptoms, in fact, resembled those of hysteria very closely. I mention the case particularly on account of its severity, and because the patient

was cured by strychnia; and some time has now elapsed without a return of the attacks.

Cod-liver oil acts beneficially by repairing the effects of imperfect nutrition, and thus improving the general condition of the body; and it can hardly have escaped the notice of any one who has prescribed the oil extensively, that certain symptoms of dyspepsia are often directly removed by it. Many cases of painful digestion, some even attended by water-brash, may be cured or greatly relieved by the oil; and, contrary to what might be supposed, it is an excellent remedy for heartburn.\*

Occasionally, however, the oil is itself the cause of nausea, flavoured eructations, and epigastric pain. Olein, freshly prepared from the oil, should then be substituted. It seldom fails in obviating the inconveniences mentioned; and the active principles of the oil, as the iodine, bromine, &c., adhere to the olein in its separation from the margarin.†

\* For an explanation of its action see Appendix A.

† See my paper in *Medical Times and Gazette*, July 21st, 1855. Also Dr. Garrod on Cod-liver Oil, in *British and Foreign Medico-Chirurgical Review* for January, 1856.

Some preparations of iron are valuable remedies in slow digestion occurring in persons of nervous and lymphatic habits, and in dyspepsia dependent on anæmia. They improve the digestive secretions by improving the blood. The preparations most easily borne by the stomach, and least likely to constipate the bowels, are the ammonio-citrate, the ammonio-tartrate, and the lactate of iron.

Several substances possess the power of exciting the action of the stomach; and doubtless from this the almost universal use of pepper, mustard, and other stimulating condiments, with certain articles of food, has arisen. Some persons, indeed, tell us that Cayenne pepper is necessary to enable them to digest with ease almost any kind of food.

In cases of slow digestion, ipecacuanha is often very useful, if taken shortly before the principal meals. Dr. Budd supposes that it acts by increasing the secretion of gastric juice; but it appears to me more probable that it benefits by increasing the movements of the stomach. The dose of ipecacuanha must be regulated by experience: a quarter of a grain

will spoil the appetite and cause nausea in some persons, while one or two grains may be advantageously taken by others.

Rhubarb in small doses appears to have similar effects to ipecacuanha, but in an inferior degree. The root of rhubarb, like that of ginger, is not uncommonly carried in the pocket by dyspeptics, and advantage is said to be derived from chewing fragments of it.

Various essential oils and aromatic tinctures are in popular use as stomach remedies. They are chiefly employed in flatulence, and cause expulsion of gas by the contractions which they induce. Brandy, sulphuric ether, and ammonia are used with the same intention and with equal benefit.

Substances such as charcoal, hyposulphite of lime, permanganate of potash and carbolic acid, which either interfere with putrefaction and fermentation and the development of vegetable parasites or absorb gases, are often very serviceable.

Wood charcoal is a remedy which has deservedly obtained much attention. In some parts of the country the scrapings of a burned stick

are a popular remedy for flatulence. Charcoal possesses the property of absorbing gases, while the value of the other remedies mentioned, depends on their power of hindering their formation. Charcoal is also antiseptic and is therefore very applicable in dyspepsia with foul eructations. The objections to its use lay hitherto in the following facts:—(1.) Very large doses were often required, and, although otherwise innocuous, inconvenience not unfrequently arose from its accumulation in the body. (2.) The power of the remedy is in proportion to its freshness. If it has been long prepared or exposed to the air, or, as inevitably happened under the old plan of administration, is saturated with fluid previous to being swallowed, its beneficial action is greatly impaired. After many experiments, a method has been found by which these objections are removed, while the kind of charcoal best adapted for medicinal purposes has been determined.\*

Certain salts of bismuth, silver, and zinc are well known to possess tonic and sedative actions on the stomach. They blunt over-

\* See Appendix B.

sensibility of its mucous membrane, and thus render it more tolerant of contact with the food. Gastric pain and tenderness on pressure are symptoms which frequently prove very difficult to subdue. In the hope of finding a remedy more efficient than any of those mentioned, I have been long engaged in trying the effect of several other substances. I have not been disappointed, and can now with great confidence recommend the purified oxide of manganese as a remedy in efficacy exceeding bismuth, which has hitherto been looked on as the best of its class. Manganese is free from the strong astringent action of bismuth on the bowels, which almost invariably produces constipation. For this reason, manganese may be given, when desired, in much larger doses than bismuth.\*

The compounds of mercury have been much employed in digestive disorders. Although it has been questioned whether this mineral exercises any effect on the secretion of bile, general experience proves its utility in some affections of the liver.

\* See my paper, *Medical Circular*, Jan. 6, 1864.

The "blue pill" and "black draught" sanctioned by the great name of Abernethy are still in common use. The temporary good effects of this treatment are undeniable, but observation has convinced me of its ultimate injurious tendency. Some other remarks on this point will be made under the head of purgatives.

Mineral waters have a high reputation in the cure of diseases of the digestive organs, and, when selected with due care and special application to the particular case, are undoubtedly excellent agents. For anæmic and debilitated patients the ferruginous springs of Bath, Tunbridge Wells, and Spa are useful. Those of Carlsbad, Wiesbaden, and Ems are good in the treatment of an irritable condition of the stomach and bowels; and that of Vichy, when acidity and other gouty tendencies are present.

*Purgatives, and the General Treatment of Constipation.*

When the lavish use of purgatives by some practitioners is considered, it may seem hazard-

ous to assert, that in treating dyspepsia these medicines are seldom required. That form of depletion which consists in blood-letting has been almost laid aside: that form of depletion which consists in repeated purgings deserves a similar fate. In the constipation of dyspepsia, purgatives may be allowed to aid, but should not substitute, the natural calls for evacuation. They should be mild in action, and laid aside when possible, as undue stimulation of the bowels only increases the evil they were intended to rectify.

Although a single daily expulsion of fæces is habitual with most individuals, there are many exceptions. The bowels may be regularly moved twice or oftener in the day, and a departure from this may induce a state of general discomfort; such persons are generally of plethoric habit, the blood-making function and the processes of waste and repair being unusually active. In delicate persons, on the contrary, and in those of the bilious temperament, the bowels may be habitually unmoved for days together, while the health continues perfect; constipation is, therefore, a relative term.

We should not fail to ascertain the habit of the individual when in health, and to regulate our practice accordingly. It is often desirable to divest the patient's mind of the necessity for moving the bowels daily. Many worry themselves without reason on this subject, and much of the injurious practice of constantly swallowing purgatives arises from it. When, however, constipation is distinctly a result of dyspepsia, great attention must be given to the bowels. On the other hand, in the treatment of some stomach affections, the means we employ are directly productive of constipation; thus the use of medicines containing tannic acid, and preparations of bismuth, opium, &c., requires us to take the bowels into special consideration.

It is a great drawback to the use of purgatives in general that their action increases the tendency to constipation. Castor oil is least liable to this objection, and when given daily, in gradually diminished doses is often attended by the best results. But in most cases it is so obnoxious to the stomach as to be quite inadmissible. The oil should be warmed be-

fore taking it, by which its viscosity is much diminished. The addition of essential oil of almonds in the proportion of one drop to six ounces of castor oil has a remarkable effect in covering its nauseousness, and the sedative effect of the essential oil renders the stomach more tolerant of the dose.

As a rule, however, those purgatives should be chosen which, both as to bulk and quality, are least offensive to the stomach. The well-known compound colocynth pill is one of the best of the stronger kind; and aloes, from its special action on the large intestine, is also valuable. The compound rhubarb pill is an excellent mild purgative. The neutral salts stimulate, and waste the intestinal secretions unduly, and increased constipation is the general result. When the stomach will bear it, sulphur is an excellent laxative; the stools which it produces have commonly the natural consistence, and it leaves no bad effects. Sulphur is also valuable for hæmorrhoidal affections associated with dyspepsia. It may often be advantageously combined with magnesia.

Tonics, either alone or combined with purgatives, sometimes succeed in regulating the bowels when other means fail. Compounds containing strychnia are especially useful. Half a grain of extract of nux vomica, half a grain of sulphate of iron, and four grains of the compound pill of co'ocynth, form a combination which, taken early in the morning generally induces gentle action of the bowels.

Hyoscyamus has the property of diminishing the griping tendencies of vegetable purgatives, and, in common with several plants of the same order, is itself a laxative. Tobacco-smoking is resorted to by many to induce action of the bowels; and Bretonneau pointed out the especial use of belladonna in constipation. Caution must be used in prescribing this active drug, and the variable strength of the extract must be borne in mind; it will be well to commence with a quarter of a grain for a dose, twice a day, and gradually to increase to one grain. I can, from experience, report favourably of this remedy.

Diet should, in all cases, be carefully considered: sometimes the liberal use of fresh

vegetables will regulate the bowels. In other cases, the substitution of bread containing bran, for ordinary bread, succeeds: the effect being produced by the mechanical action of the bran. It is unsuitable, therefore, for cases in which the gastro-intestinal mucous membrane is irritable. Some articles of diet, as salted meats and fish, hard-boiled eggs, &c., and hard water, tend to confine the bowels, and should be avoided.

Nothing is more important than the culture of habit in moving the bowels, nor is there any greater source of constipation than inattention to it. Efforts of evacuation should, in general, be daily made at a stated period. These efforts may be at first ineffectual, but in order to insure success the plan must be followed systematically and with much resolution. The efforts should be sustained for about ten minutes, and it is surprising how much good is often effected by a persistence in this alone.

If, however, after a trial of some days the efforts continue unavailing, the injection of simple water should be had recourse to. A

prejudice exists in this country against the enema apparatus, often difficult to overcome. But it is a valuable aid to treatment, and its use is free from the objections to which purgatives are open. At the time already mentioned, let a pint of water slightly warmed, if the weather is very cold, be slowly injected and retained a few minutes, when with its expulsion the result desired will generally happen. On the following day let the natural efforts be resumed ; and, if necessary, the injection must be again repeated. Thus employed, the enema will be found most useful in the formation of habit. When the plan recommended is diligently carried out, for about ten days or a fortnight, the natural functions of the bowels are usually restored.

## CHAPTER IX.

### A BRIEF STATEMENT OF THE PHYSIOLOGY OF DIGESTION.

THE simplest conception of the human digestive apparatus is an elongated cavity, in the upper part of which a fluid is secreted which possesses the power of reducing solid food to a pulp. Water, and probably a portion of the aliment dissolved in it, is drained through the porous side of the blood-vessels spread over the walls of this part of the cavity. But the pulp itself reaches the same destination through certain minute tubes—the absorbents—which communicate between another portion of the cavity and the veins.

If, however, we regard the alimentary canal as including gullet, stomach, and intestines, simplicity vanishes. The cavity not only greatly varies at different points, but is also

subject to frequent expansion and contraction. The food is taken into the stomach, rolled about while there, and then propelled through the intestines by muscular contrivances of singular ingenuity.

The mode in which absorption and secretion are connected with the minute cell-mechanism of the stomach and intestines is next to be considered. We find the mucous membrane not only the agent by which the blood is replenished by absorption, but also the medium through which certain fluids are copiously poured into the digestive cavity itself. We observe that the membrane is in some places studded with innumerable points—the mouths of minute secreting organs; and we discover large supplemental organs—the liver and pancreas, intended to prepare elaborate fluids to be sent into the common reservoir. By continuing the investigation, we find that the parts and functions of the digestive organs are most complicated, and that some, as yet, baffle investigation.

As the actions to which food is submitted are performed within certain mechanical limits,

they may be classified in four groups. These are—

The actions of the mouth and gullet.

The action of the stomach.

The action of the small intestine.

The action of the large intestine.

In the first group, mastication and insalivation claim especial attention ; and one peculiarity of these actions is, that they are visible to us. The familiar act of chewing is seldom a subject of reflection, yet it throws into motion a more complicated system of levers, accompanied by a drain of fluids from more curiously adapted apparatus than the arts can parallel. Another point of more practical importance is peculiar to this group—the actions which compose it are, for the most part, within control. Food may be well or badly chewed as we please : once beyond the portals of the throat, this transient power over it is lost. The pleasures of taste may beguile ; inattention or voracity may induce us to eat too rapidly or too much ; but nature, in general, punishes the transgression, and the man of weak digestion suffers especially. Gastric sensations are experienced

that should have no existence, and dyspepsia is produced.

By the crushing and dividing action of the teeth, the food is reduced to a condition adapted to the operation of its proper solvents. The necessity for sufficient mastication is proved by the evidence of design in the form and arrangement of the human teeth ; and these also afford conclusive arguments in favour of a mixed animal and vegetable diet.

During mastication, the salivatory fluids become intimately mixed with the food. Mastication is itself aided by this, while the food is prepared for the action of the gastric juice. The chemist frequently employs water as a like means of preparing substances ; but saliva is much better adapted than water for blending with many substances used as food. The numerous air bubbles for which saliva is remarkable have their special purpose ; since the presence of atmospheric air in the stomach is accessory to digestion. But an essential use of insalivation is lubrication of the morsels : without this, it would be impossible to swallow certain kinds of food.

Besides these uses, saliva has at least one well-ascertained chemical action: it possesses the power of converting starch into sugar. As this action continues in the stomach, it is probable that saliva exercises an important influence in the digestion of farinaceous substances.

Saliva being formed by several glands which have their outlets in the mouth, consists of a mixture of secretions differing considerably in their nature. It has been ascertained, by means of tubes passed into their respective ducts, that the secretion of the parotid gland contains little solid matter, and is of the consistence and colour of water, while the syrup-like fluid of the sub-maxillary and sub-lingual glands contains a larger proportion of solid constituents.\* Numerous follicular glands of the mucous membrane of the mouth also contribute their secretions to form the saliva: in a healthy state, it always possesses an alkaline reaction.

Now, it seems certain that these various fluids have their peculiar functions. As the

\* Compare C. Bernard, in *Medical Times and Gazette*, June 16, 1860.

parotid and sub-lingual secretions, are most abundantly poured out during mastication, these are chiefly concerned in the dilution of food. The supply from the sub-maxillary gland is greatest at the moment of swallowing; and to assist this, its lubricating secretion is admirably suited. The chemical effects of saliva appear mainly due to the secretion of the minute glands of the mucous membrane of the mouth.

Great difficulty exists in estimating the quantity of saliva. It is chiefly regulated in health by the requirements of mastication, and is, therefore, like gastric juice, proportionate to the aliment. The conclusions of Bidder and Schmidt, from experiments recently made, give as the average amount about three pounds of saliva in twenty-four hours, although its secretion appears to be arrested during sleep. Here it may be observed that the tendency of new observations on the digestive fluids is to prove their quantity greater than had been previously supposed.

Certain stimulants greatly augment the flow of saliva. Tobacco smoking is the cause in

some persons of an immense loss of the secretion, not the least injurious consequence of the habit.

It was often observed, when hand-spinning was the custom, that women so employed became very thin. This was with good reason attributed to the waste of saliva occasioned by the constant necessity of wetting the fingers during the process.

The flow of saliva is also governed by certain mysterious sympathies. It can be increased by merely directing attention to it; so, when the appetite is keen, not only the smell or sight of savoury food, but even the idea of it produces a like effect.

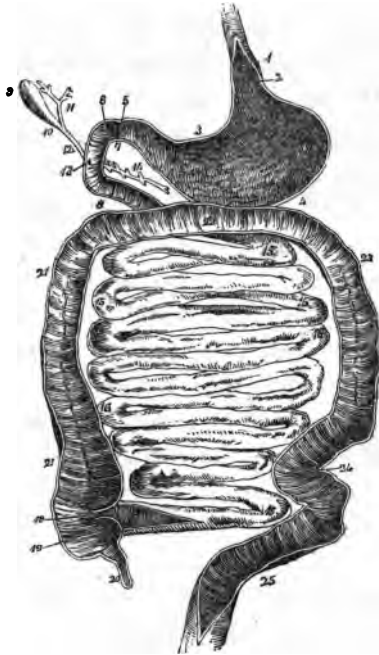
Besides a number of other substances in solution, saliva possesses two that are peculiar to it. One of these is ptyalin, which forms about one and a half per cent. of the whole, and to it are due the characteristic smell and known chemical properties of the secretion. The other, sulphocyanide of potassium, exists in smaller proportion, and from its constant presence, would seem to answer some important though unknown purpose.

The act of swallowing is succeeded by a series of alternate relaxations and contractions throughout the long tube of the gullet, by which the morsel is propelled downwards into the stomach.

In shape the stomach has been aptly compared to the pouch of a bagpipe, which it closely resembles. It is capable of great alteration in size. In the dead subject I have found its average capacity when completely distended about two quarts. The stomach is furnished with two apertures—the cardiac orifice at its left or larger end, or that at which the gullet opens, and the pyloric orifice, which leads into the small intestine on the right. The walls of the stomach are formed of three coats—a very thin external covering of serous membrane, a middle muscular coat, and an internal mucous lining; yet the substance of the whole does not exceed that of moderately thick card-board.

On reaching the stomach, the food is, again by aid of muscular action, brought into contact with a new secretion. In an account of this

## THE DIGESTIVE TUBE.



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|---|--|
| <ol style="list-style-type: none"> <li>1. The Gullet.</li> <li>2. The Cardiac orifice of the Stomach.</li> <li>3. The lesser curvature of the Stomach.</li> <li>4. Its greater curvature.</li> <li>5. The Pylorus.</li> <li>6. Superior portion of Duodenum.</li> <li>7. Perpendicular portion.</li> <li>8. Inferior portion.</li> <li>9. Gall Bladder.</li> <li>10. Bile Duct leading to the Gall Bladder.</li> <li>11. Bile Duct leading from the Liver.</li> <li>12. Common Duct, formed by junction of two preceding.</li> <li>13. Its aperture in the Duodenum.</li> </ol> | <ol style="list-style-type: none"> <li>14. Duct of the Pancreas, opening into the Duodenum close to where the Bile Duct opens.</li> <li>15, 15, 15, Jejunum.</li> <li>16, 16, 16, Ileum.</li> <li>17. Ileum opening into Great Intestine.</li> <li>18. Ileo-cæcal Valve.</li> <li>19. Cæcum.</li> <li>20. Vermiform Appendix.</li> <li>21, 21, Ascending Colon.</li> <li>22. Transverse Arch of Colon.</li> <li>23. Descending Colon.</li> <li>24. Sigmoid Flexure of Colon.</li> <li>25. Rectum.</li> </ol> |
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occult process, the observations of Dr. Beaumont, in the remarkable case of Alexis St. Martin, are indispensable. There exists in this man a free communication between the stomach and the outside of the body, the consequence of a gunshot injury in early life.\* Dr. Beaumont observed through this aperture that food introduced from the gullet to the stomach, immediately commenced a series of revolutions. These revolutions are made from right to left, and are completed in from one to three minutes. They become quicker as the reduction of the food into chyme progresses.†

During the time of these motions, the pyloric extremity of the stomach is in a state of contraction, but allows the food, when reduced to a pulpy mass, or chyme, as it is then termed, to pass into the intestines. A full meal is

\* St. Martin is or was very lately living. The accident referred to occurred in 1822, and Dr. Beaumont commenced his observations in 1825.

† See woodcut. The morsel, on reaching the stomach by the cardiac orifice (2), passes round the greater curvature (4) to the pyloric orifice (5); thence by the lesser curvature (3) to its point of departure, when a new revolution is commenced.

probably thus gradually diminished until the stomach becomes entirely empty. Should, however, injurious substances or indigestible food be present, the organ becomes at last weary of its efforts—the contraction of the pyloric orifice gives way, and the undissolved residue enters the intestines, and becomes a source of irritation. .

Obviously, then, the use of this persistent churning is, that every portion of the alimentary mass shall be quickly brought into contact with its liquid solvent. The chemist, with the same intention, shakes up substances when he wishes to hasten solution; but in the case of the stomach, the constant removal of dissolved portions must greatly assist further action.

This solvent, or gastric juice, is the product of small tubular glands with which the entire mucous surface of the stomach is studded. There is nothing in the physical properties of the fluid to indicate its potency. Clear, colourless, and very slightly viscid, it is moderately acid during healthy digestion, while the scanty secretions of the empty stomach are neutral or alkaline. Certain minute and somewhat pecu-

liar bodies (rennet cells) are discovered in the gastric juice by means of the microscope. They are formed in the tubular glands of the stomach; but whether they really possess properties conveyed by the name given them is not settled. Frerichs believes that they supply the true gastric ferment.

But what is this gastric ferment? We have seen that the peculiar properties of saliva depend on the presence of ptyalin. In gastric juice we find another peculiar albumen-like substance, and this is termed pepsin. The action of this pepsin is devoted to that important class of alimentary substances into which nitrogen or azote enters, including the flesh of animals, fish, and eggs. As regards solution, there are few more refractory substances, yet they are readily reduced by the gastric juice to a mass uniform in physical as well as chemical qualities. Its action also causes substances in an eminent degree prone to coagulation—as, for example, in the case of milk—to lose that quality, besides producing other changes. On this account, the reduction of azotized food in the stomach is regarded as

including not merely solution, but the formation with the gastric juice of new compounds. In recognition of the agent indispensable to these changes, the compounds have been termed "peptones."

As for the starchy and fatty elements of food, they undergo no changes from the secretions of the stomach, beyond minute subdivision.

The amount of pepsin in gastric juice is exceedingly variable, but seems to be in proportion to the nature of the food. In the case of carnivorous, it is much more copious than in that of herbivorous animals. In man the proportion appears to hold a medium place, but to be still remarkably influenced by diet. The analyses of gastric juice obtained by Dr. Grunewaldt, from a woman who had an external opening into her stomach, yielded 36.6 parts of pepsin in 1000 of the juice. The patient was then well fed, but subsequently returned to her accustomed and poorer fare. Analyses of the gastric juice then made by Dr. Schroder yielded only 3 parts of pepsin in the 1000 of juice. It has been repeatedly proved

that alimentary substances undergo solution in gastric juice out of the body with considerable facility.

Acidity is an invariable property of gastric juice secreted during digestion. Yet, strange as it may seem, chemists have not been able to determine the particular acid always present. The truth is, several acids are found in human gastric juice, but the question of the essential acid may be regarded as now narrowed to two—the lactic and the hydrochloric: at one time hydrochloric was in the ascendant; but more recently, in some carefully conducted experiments by Dr. Smith, of Philadelphia, on gastric juice obtained from St. Martin, lactic acid was found to be “the main agent in producing the characteristic reaction.”\*

Copious as the saliva is, the gastric juice far exceeds it in quantity. The estimate of Dr. Schroder is one of the latest and most reliable. He tells us that the average amount secreted in twenty-four hours by the woman previously mentioned was fourteen kilogrammes, or up-

\* Experiments on Digestion, page 11, by F. Smith, M.D., Philadelphia, 1865.

wards of thirty pounds.\* This is astonishing, and reveals to us an immense water circulation between the blood-vessels and the alimentary tube. It is plain that, if the secretions of which this tube is the receptacle were not taken back into the blood, we should be obliged to drink much more largely than we do.

It was proved by Dr. Beaumont that the amount of gastric juice is regulated by the wants of the system—not by the quantity of food swallowed. As an alkali will only combine with an acid in a definite proportion, so a given quantity of gastric juice will only dissolve and combine with a proportional quantity of food. Any surplus of the latter thus becomes a cause of distress either to be got rid of by vomiting, as commonly happens in the case of children; or, what is far worse, is passed into the intestines, which are fretted by its presence.

Besides gastric juice proper, the stomach, especially when empty, secretes tenacious mucus,

\* *Succi Gastrici Humani Vis digestiva, ope fistulæ stomachalis indagata.* Dorpati, 1853.

which forms a thick protective sheathing for its internal surface.

The food on passing out of the stomach by the pyloric opening, so named from its gate-like valve, enters the small intestine. The pulpy mass is now slowly propelled through this narrow and tortuous tube, measuring about twenty-five feet in length. The artificial divisions of this intestine into duodenum, jejunum, and ileum, need not detain us. But the first part, about twelve inches long, known as the duodenum, has some interesting characteristics. Its fixed position is clearly destined to prevent the food passing too rapidly out of the stomach, and displacement of the latter organ is thus prevented. The contributory secretions of the liver and pancreas are poured into the upper part of the duodenum.

The sensibility of the duodenum is greater than that of any other part of the alimentary tube. This sensibility seems intended for supplying the chyme, as it passes from the stomach, with its due proportion of bile and pancreatic juice. The flow of these secretions is probably regulated by the quantity of

material which passes over the sensitive intestinal surface, and a nervous connection between this surface and the glands would account for the regulated supply. It would certainly be analogous to what happens when a flow of saliva is instantly produced by the contact of a morsel of food with the interior of the mouth. Now, it is proved by experiment, that the supply of bile and pancreatic juice is suspended when digestion ceases, and in cases of death, after long abstinence or from starvation, the gall-bladder is invariably found full of bile.

The stomach and duodenum are constantly alluded to by old writers under the title of the "*primæ viæ*," and the passage through them of "*crudities*" was justly regarded as a source of varied ills.

Chyme receives in the small intestines the name of chyle. It is now coloured by the bile, and its fatty portions are, as we shall see, acted upon by the pancreatic juice. But the chyle is here further elaborated, for the small intestine not only receives the several digestive fluids, but secretes a proper solvent juice. Yet this

tube, when compared with the stomach, must be regarded as essentially a medium for absorption. Water, and substances soluble therein, are directly absorbed by the blood-vessels of the stomach ; but here we find in addition oily and chylous matters in general, taken up with a like facility. For these purposes the villous, or velvet pile-like surface of this intestine, is specially adapted ; and the distension of its lacteal vessels, as seen in an animal killed soon after a meal, proves how actively they aid absorption. Numerous folds of the intestinal mucous membrane are intended to assist the process by increasing the surface to be traversed by the food, and delaying its passage. But the subject of absorption can hardly be brought within my present limits.

Owing to the difficulty of obtaining unmixed intestinal juice, estimates of its quantity are very unreliable. It was set down by Haller at eight pounds in twenty-four hours, while half a pound in the same period is the estimate of Bidder and Schmidt. A marked difference exists between the products of the gastric and the intestinal glands : the intestinal

juice is alkaline, and its solvent power is not interfered with by the presence of bile, as in the case of the gastric secretion. The properties of dissolving albuminous substances, and of converting starch into sugar, are certainly possessed by the intestinal juice. We may, therefore, regard it as supplemental to the gastric juice and saliva, and, as we shall presently see, it co-operates with the pancreatic secretion in the manufacture of sugar.

The secretion of the small intestine must necessarily be intermixed with all the other secretions which flow into its cavity. A combination is thus formed probably capable of reducing such alimentary substances as had escaped solution in the stomach, for of the existence of intestinal digestion there is no doubt.

The large size, the shape, and the superficial position of the liver, make it, even in a popular sense, one of the best-known organs of the body. No organ is so much maligned as the liver. Pains and various ill effects are daily attributed to it, or its responsible agent, bile, of which both are guiltless. Nor can it be denied

that this hostile feeling is much encouraged by practitioners, who find the liver a convenient scapegoat. The truth is, we have much to *unlearn* as well as to *learn* about the diseases and the functions of this gland.

Modern researches prove the liver to be essentially a blood-refiner. On the one hand, it separates from the blood certain carbonaceous matters in forms suitable for direct combustion in the lungs, while on the other hand it secretes bile. Most of this secretion is absorbed again into the system with the food. Bile is rather accessory than indispensable to digestion. Dogs in whom the flow of bile is directed outwards through fistulous openings, so that none of it passes into the intestines, may, as M. Blondlot has proved, live and enjoy themselves for years. The chief obvious effects of such an operation are voracity, loss of weight, flatulence, and a putrescent tendency in the intestines when the animals are fed on meat.

Bile, as found in the human gall-bladder, is a viscid, greenish-yellow coloured fluid, having a bitter taste, the intensity of which is proverbial. Its principal organic constituent is

glyco-cholic acid, and this is united with alkalies, of which the principal is soda. To these alkalies the well-known cleansing properties of ox-gall are mainly due; but, when quite fresh, bile is neutral. It seems that untimely decomposition of animal food is prevented by the bile; and it also appears effective in preventing the fermentation of starchy food. That bile is concerned in the assimilation of fat is more than suspected; but how it effects this is not well understood. The quantity of bile secreted in twenty-four hours is estimated at between three and four pounds.

The pancreas, or sweetbread, as it is termed in the lower animals, resembles a salivary gland seated in the abdomen. In structure the comparison is almost complete, and in physical aspect pancreatic juice is saliva without air-bubbles. The pancreatic juice is alkaline, like saliva, and like it, contains a small proportion of a peculiar ferment. But the quantity of these fluids appears to be very different. The amount of pancreatic juice secreted in twenty-four hours by a man weighing one hundred and forty pounds, has been

estimated by Bidder and Schmidt at seven ounces. Considering the size of the gland, and the apparent importance of the secretion, I cannot help believing that the quantity is much greater.

Like saliva, pancreatic fluid converts starch into sugar; but the latter secretion also exercises a peculiar action on fat, the precise nature of which must be regarded as *sub judice*. M. C. Bernard asserts that the juice forms, with fat, an emulsion which is then absorbed. I believe, however, that pancreatic juice really decomposes fat by separating the olein or absorbable part from the margarin and stearin, and these latter substances are excrementitious.\*

In a recent work, a very important action has been attributed to the pancreas by Baron L. Corvisart. He asserts that its fluid exercises an energetic digestive power over albuminous substances, and that the action of the organ is, therefore, supplementary to that of the stomach.† Supporters of this view are not

\* I venture to refer the reader to my observations on this subject in the *Medical Times and Gazette*, June 3, 1854.

† Sur une Fonction peu connue du Pancréas. La Digestion.

wanting, while on the other hand, objectors, backed by experiments, have sprung up.

Some important inferences may be drawn from the foregoing. Different elements of food are digested by the action of different organs. The starchy portions are transformed into sugar—the absorbable condition, by saliva. Gastric juice dissolves the albumen, fibrin, casein, &c.; while, whatever other function the pancreatic secretion possesses, it is certainly concerned in the digestion of fat. By the admixture of the proper fluid of the small intestine with all the foregoing, as well as with bile, a compound is formed which comes nearer the character of a universal solvent than any of the secretions possess singly. In the small intestine, then, the solution of all the principles of food is at length accomplished; and it is here also that absorption is completed.

The large intestine is about a fifth of the length and twice the diameter of the small intestine, from which it is separated by a valve.\*

tion des Aliments azotes. Par Lucien Corvisart. Paris, 1857-58.

\* See woodcut, page 195.

It consists of three parts. The cæcum, which the small intestine joins, has attached to it a short gut, about three or four inches in length and the thickness of a quill, called the vermiform appendix. Closed at one end, it opens by the other into the cæcum. It secretes thick mucous, which appears to be provided to assist in expelling the fæces, since they attain a semi-solid consistence in the lower bowel. The opening of the ileum into the cæcum is provided with a valve so designed as to allow free passage of matters into the large intestine, but to prevent their return. The colon constitutes the principal part of the large intestine, and, being distensible, is very capacious. It ascends at first towards the liver, passes horizontally below the stomach, descends by the left side of the abdomen, and after a peculiar flexure ends in the rectum. The internal surface of the colon presents a number of cavities or cells, designed to promote the gradual descent of the excrement. But when the action of the intestine is weakened, these cells cause great inconvenience by retaining the fæcal matters. The rectum is a continuation of the colon, and

is the last portion of the intestinal tube. Straight in its course, as its name implies, it is also capable of great distension.

There is no immediate connexion between the amount of food and the bulk of the fæces. The lungs, the kidneys, and the skin, form additional outlets for any overplus of digested material. The chief contribution from the small to the large intestine is the trifling residue of food which escapes digestion and absorption, comprising hairs, portions of bone, the husks of seeds and kernels, the internal woody fibres of vegetables, and such refractory substances.

By far the largest portion of the fæces is thrown out by the minute glands of the colon. This acid excretion is characterized by a disagreeable but not naturally a putrid odour, and consists, like the solids of the urine, of material removed in the renovation of the body. The large intestine is a main sewer, with numerous contributories,—a reservoir for waste, to be periodically emptied.

The large intestine does not appear to possess any digestive powers, although it is capable of

absorbing substances in solution. This capacity probably increases vicariously when that of other portions of the alimentary canal is interfered with, for in such cases, nutritive enemata are of the greatest service.

The gases of the alimentary canal hold a position of importance, as we always find the healthy stomach and intestines somewhat resonant on percussion. Obviously, then, a certain amount of gaseous distension is useful and necessary. Carbonic acid and nitrogen in large proportion, with some oxygen and a little hydrogen, are the gases commonly found in the stomach and small intestines; while besides all these, sulphuretted and carburetted hydrogen are found in the large intestines. For some of these gases we can easily account. A considerable amount of common air is constantly swallowed, entangled in saliva, and we accordingly find the components of air in the stomach, but with a diminished proportion of oxygen; and in the intestines this is still more the case. A portion of the oxygen is supposed to be taken up by the capillaries, while a portion of it combines with the food. Some

authorities maintain that gases emanate from the mucous membrane, but in proof of this nothing positive can be advanced. Fermentation and putrefaction of food must account for the presence of the other gases, as they do not exist in the blood, and cannot be derived from the atmosphere.

In concluding this brief sketch of the physiology of digestion, let me again draw the reader's attention to the large quantities of several of the digestive secretions. In a man weighing ten stones, or one hundred and forty pounds, they reach in the aggregate, in twenty-four hours, to a sixth of his weight; at least, this is fully borne out by the preceding data. But obviously it is not merely quantity, but quality of secretion that is essential. These abundant and elaborate compounds are to be regarded as products of the entire economy—not merely of the glands from which they respectively flow; and nothing is more essential to the due performance of secretion than a healthy state of the nervous system.

## A P P E N D I X.

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### A.

#### *Experiments as to the cause of Heartburn.*

THE term cardialgia or heartburn is variously interpreted both by the profession and by patients. Some understand by it epigastric pain with a sensation of heat; some include under it the pain which accompanies pyrosis; while others restrict it to a peculiar scalding sensation extending from the cardiac orifice of the stomach along the œsophagus to the mouth. The latter appears to me a proper restriction, and my present observations will be confined to the affection as thus understood. Various explanations have been offered of it. Dr. Copeland, speaking of heartburn, says, "It is generally attended by acid or acrid eructations, exciting irritation in the throat and fauces." Dr. Chambers tells us that heartburn may be looked upon as the milder disease of which water-brash is

the severer development, but that fluid is in no case concerned in producing the sensation, which is a "spasmodic pain in the œsophagus."

From the testimony of many patients as well as my own experience, I maintain, however, that heartburn is usually attended by the ejection from the œsophagus of a very small quantity of acrid fluid, frequently described as a single drop, causing a peculiarly disagreeable and occasionally a greasy taste in the mouth. Gas from the stomach sometimes accompanies the drop, and to this is probably due the idea conceived by some patients that the sensation resembles the "passage of hot smoke."

On considering the taste experienced as well as the conditions under which heartburn comes on, it seemed to me that the cause of it was the presence of butyric acid. This acid is a product of deranged digestion; and the disgusting smell of vomited matters from which I have by distillation obtained butyric acid, in considerable quantity, is chiefly caused by it. Heartburn is very generally induced by eating food in which butyric acid already exists, as pastry, &c., and the acid is also formed out of its elements in the stomach. The removal of heartburn by alkalies affords proof that it is caused by an acid.

But if my supposition were correct, heartburn would be produced by the passage of butyric acid down, as well as up the œsophagus. To test the matter I obtained some pure acid, and experimented on myself and on two gentlemen, who, from actual experience of true heartburn, were competent judges. The plan adopted was to dip a pill of some inert substance stuck on the point of a long needle into butyric acid, either pure or diluted. The pill was then carried by means of the needle to the back of the tongue, without touching the interior of the mouth, and swallowed. The taste and sensation produced in the œsophagus were pronounced in every instance to be identical with ordinary heartburn, but varying in degree according to the strength of the acid; and in the case of one of the gentlemen, the sensation extended to the stomach. Moreover, as in heartburn itself, a small quantity of alkali at once gave relief.

My explanation of the production of heartburn, founded on the preceding observations, is as follows:—In certain weak conditions of digestion, or when it is overtaxed, butyric acid is set free from food in which it existed, or else it is formed out of the elements of starchy food, as is well known to be possible. The acid being in excess, but not

pure, or else it would be soluble, rises to the surface of the contents of the stomach, where it combines with melted fat, for which it appears to possess a strong affinity. The acrid mixture, on being presented to the cardiac orifice by the motions of the stomach, is instinctively rejected into the œsophagus, and by the reversal of its proper movements transmitted to the mouth, accompanied by the sensations of heartburn. The miscibility of fat with butyric acid explains the relief of heartburn by cod-liver oil.\* It acts by diluting the acid.

\* See page 175..

## B.

*Flatulence and its successful treatment by a novel use of charcoal.*

THE stomach and intestines always contain gases. They seem, both in a chemical and mechanical point of view, to be essential to digestion. A good deal of common air is swallowed with the food, and the remarkable facility with which air-bubbles are formed in the saliva is referrible to this special purpose. It follows that oxygen and nitrogen are natural to the stomach, and it has been well ascertained that nitrogen is greatly in excess of oxygen, showing that even in the stomach this gas is in some way employed in the vital processes. But as gases are easily evolved by fermentation, and as saccharine and other fermentable matters dissolved in water are present in the gastro-intestinal tube, it results that its aeriform contents are far more complex. Perfectly healthy digestion probably does not admit of ordinary fermentation; but it is certain that a very slight defect in the process gives rise to it, and carbonic acid is then freely formed. Gaseous distension of the stomach and bowels thus becomes

one of the most troublesome complications of dyspepsia. In the stomach carbonic acid, and more rarely sulphuretted hydrogen, known by the characteristic taste of the eructations, and in the intestines these gases, as well as carburetted hydrogen, are the sources of trouble.

Two other causes of flatulence have been advocated, and the suddenness with which it is occasionally developed lends them some support. It has been supposed that gases are disengaged into the intestines and stomach from the blood in their capillary vessels. No satisfactory proof of this theory has been offered, and the gases of the blood do not bear such a proper relation to those of the digestive tube as to make it probable.

According to another view, a sudden relaxation of the abdominal muscles, as well as of the proper muscles of the stomach and bowels, permits an equally sudden expansion of gases that had been previously compressed within these hollow viscera. It is true that gases being elastic, become under sufficient pressure greatly diminished in bulk, and that they expand in proportion when the pressure is removed. But to account for flatulent distension on this principle, an amount of pressure must be presupposed, which is *primâ facie* improbable.

To test the matter, I tried the following experiment :—

An elastic india-rubber bag one inch and three-quarters in diameter, when filled, the sides being one-twentieth of an inch thick, was introduced into another bag of the same dimensions. A stop-cock was adapted to the inside bag, and both were then forcibly distended with carbonic acid introduced into the inner bag until the outer one measured three inches and two-thirds in diameter, when escape of the gas was prevented by turning the cock. The gas was thus, by the elasticity of the bags, subjected to a much higher pressure than any ever likely to be steadily exerted upon the contents of the gastro-intestinal tube. The outside bag was then removed by cutting, when, allowing for its thickness, the diameter of the bag still inflated was found not to have enlarged in an appreciable degree. Here the removal of the outer bag represented a sudden relaxation of the gastric muscular force, and supposing the original pressure to have been only equal to what may occur in the stomach according to the theory in question, expansion of the gas was to be expected. But as no change resulted, I infer that no pressure can possibly be exerted on the gases in the alimentary cavities sufficient to pro-

duce by its withdrawal the phenomena of marked and sudden *flatus*.

My explanation of the sudden occurrence and disappearance of flatulence is this :—If a bladder be half filled with air, and it be then compressed so as to accumulate all the air into one extremity, this last will assume the proper dimensions of the part. Now, we know that local and irregular contractions of the intestinal tube are not infrequent. The hour-glass contraction of the stomach is an example of it. In the spasmodic conditions which hysteria often presents, sudden contractions of parts of the alimentary tube occur, and the gas normally present in these portions being suddenly displaced, accumulates in the uncontracted parts. The result is precisely that described as occurring in the case of the flaccid bladder when compressed, the gases rushing from one part of the intestines into another, and from the small intestines into the stomach, cause sudden dilatation. The subsidence of compression in the one case as well as in the other, explains the equally sudden removal of distension.

When physician to the Smyrna Hospital, during the Crimean war, I witnessed several cases in which distension of the digestive cavity was induced,

apparently by the marvellous ingenuity of soldiers in feigning diseases. Several of our patients became affected with "phantom tumours" of the abdomen. Their seat was usually the hypochondriac region of either side, and their size about that of a cricket-ball, which in firmness they almost resembled. We could not explain their production beyond the fact that the voluntary muscles had much to do with it. When the subject of such a tumour was brought under the relaxing influence of chloroform the tumour invariably vanished without any expulsion of gas. It is now plain to me that they were caused by the joint, and so to speak, educated action of the muscles of the abdomen and diaphragm. The gases were by their means dislodged from some parts of the alimentary tube while they accumulated in others, as occurs in hysteria, from the action of the involuntary muscles.

The relative amount of each gas in the alimentary tube greatly depends on the nature of the food, but nitrogen seems to be mainly the natural distending agent. Flatulence consists, then, in the exaggeration of a natural condition, of which there is probably no normal standard, and it occurs in every degree up to complete distension. When far advanced, interference with the peristaltic motions

of the tube, and therefore with digestion itself, ensues. The functions of adjacent vital organs also become seriously impeded by pressure, and dyspnoea, palpitation of the heart, or intermission of its action, result. If the muscular coats of the stomach and bowels are vigorous, the natural efforts are followed by expulsion of a portion of the gas, and this may generally be aided by stimulating remedies, carminatives, as they are called. But distension causes a temporary paralysis of these coats; and hence we are often told by patients suffering from this cause, that if they could "only get a little wind off the stomach much more would soon follow." The contractile power recovers itself as soon as the force which overpowered it is lessened.

The remedies for flatulence may be classified as follows into—

Those which prevent fermentation ;

Those which favour the expulsion of gas ;

Those which absorb gases.

The first and second need not at present delay us. Medicines are in common use for these purposes. Such is not the case with those intended to relieve tension by direct absorption of gas—a mode of treatment specially adapted to gastric flatulence.

Indeed, I am not aware that any writer has advised medicines to be given with this special object.

Some time ago, I attended, with Mr. Spencer Wells, a case of albuminuria, with disease of the heart and other complications, in which flatulence was most refractory. The subject of it was a gentleman of the highest intelligence, and he often assured me that his other sufferings were trifling compared with what he endured from that single cause. Unable to lie down at night, the day was miserably spent in search of even temporary relief. "Such," he would graphically say, "is my utter prostration, and at the same time horrible restlessness, that I feel like a worm that had been trodden upon." The usual stomach remedies, including charcoal-lozenges, were ineffective. It was then that the idea occurred to me that charcoal, administered in a new form, was a promising remedy. Charcoal is not unfrequently prescribed in cases of flatulence, but the conditions necessary for success are not fulfilled. These are, that it shall be taken into the stomach dry and in a fresh state.

About twenty-five years ago Dr. Belloc, a retired French officer, turned his attention to charcoal as a remedy for dyspepsia. He was himself a sufferer,

and had thus an opportunity of personally testing its action. He decided after many trials that charcoal made from poplar wood is the best. He found that the charcoal of some other woods caused a disagreeable taste in his mouth—even painful excoriations of the mucous membrane—thirst, and a pinching sensation at the pit of the stomach. He was in the habit of prescribing from two to six teaspoonfuls, but says he has himself taken as much as 500 grammes—more than fifteen ounces in a day. The Académie Nationale de Médecine reported very favourably on a memoir Dr. Belloc published on the use of charcoal, and in France it soon became a favourite remedy. Its reputation spread to this country, and now we find charcoal lozenges, and even charcoal biscuits, sold as dyspeptic remedies.\* Belloc's charcoal is in the form of a moist powder. He advised that it should be taken stirred up in water. In this country charcoal is occasionally prescribed in mixtures. The biscuits and lozenges must of course be thoroughly impregnated with saliva to enable them to be swallowed. Now, charcoal taken in any of the above modes

\* Its qualities are lauded in an essay by Mr. Bell "On Vegetable Charcoal: its Medicinal and Economic Properties." Second Edition. Churchill, 1857.

always seemed to me of little efficacy. My device was to give the ordinary wood charcoal freshly prepared and hermetically sealed in gelatine capsules. Nothing could have been happier than their effect in the case already referred to. Three or four capsules were sufficient to give complete relief each time. Nor is it often that the objective evidence of beneficial action is so plain. When the sound on percussion over the greater end of the stomach was quite tympanitic, this would completely subside into the ordinary clear tone of the part after the capsules had been swallowed a few minutes.

Encouraged by this case, the capsules were given in many other instances with excellent results. A series of experiments were now commenced, with a view to determine what kind of charcoal was best for the purpose, and whether the matter admitted of further improvement.

The power of absorbing effluviæ possessed by charcoal had been known for ages, but its action upon different gases was first tested towards the close of the last century by M. Lowitz. The subject was pursued by Count Morozzo, and afterwards more fully by M. Saussure. He used boxwood charcoal exclusively in his experiments, and found that a single volume of it absorbed the gases which

possess a present interest in the following proportions :—

Sulphuretted hydrogen	...	...	...	55
Carbonic acid...	...	...	...	35
Oxygen	...	...	...	9·2
Nitrogen	...	...	...	7·5
Carburetted hydrogen	...	...	...	5
Hydrogen	...	...	...	1·7

The able researches of Dr. Stenhouse, published in 1855, greatly increased the interest in the subject. His experiments were mainly directed to the deodorizing qualities of charcoal, and he proved beyond question that its properties of destroying the smell of putrid animal or vegetable bodies depended, not, as had been previously supposed, on its antiseptic power, but on the very opposite quality of absorbing and oxidising effluviæ. Several others have since that time investigated this absorbent action, and Mr. Hunter has recently published an account of his experiments, showing the relative amount of various gases taken up by different kinds of charcoal.\*

He found that charcoal made from cocoa-nut shells possessed most power, and deduced a general rule that charcoal made from the harder woods was

\* *Philosophical Magazine*, February, 1865.

much superior to that from the softer. It may be added here, that animal charcoal, so useful as a decolorising agent, is very inferior as an absorbent.

In my own experiments, the gases were collected by displacement in the usual way. By a simple arrangement, the amount of absorption was determined by the quantity of mercury which flowed into, and was retained in the vessel containing the gas, into which the charcoal had been introduced. As the experiments have had a practical aim, they differ in some respects from those conducted by the purely scientific chemists. The gases were not dried, since in the moist state they more closely resemble those of the alimentary cavities, and combinations of other substances with charcoal were tried in the hope of discovering a still more effective absorbent than simple charcoal. The experiments have been very numerous, but it has not been thought desirable to encumber the table with more than seem necessary to elucidate particular points; and as the absorption of carbonic acid possesses by far the most interest, this has alone been given. The absorbent action was instantaneous, and about seven-eighths of the whole was completed within two minutes. The time allowed for each experiment was an hour

but absorption continues at a slow rate for many hours. To obtain good results the charcoal must be exposed to a high heat in the crucible, until gas no longer escapes ; and it would seem that charcoal newly made is superior to that which has been re-ignited.

*Table showing the Absorption of Carbonic Acid by  
Twenty Grains of Different Kinds of Vegetable  
Charcoal.*

	Experi- ment.	Mean-
Vegetable ivory nut in small fragments, freshly ignited ... ..	$\left. \begin{matrix} 2.26 \\ 2.26 \\ 2.20 \end{matrix} \right\}$	2.24
Vegetable ivory, finely powdered and freshly ignited ... ..	$\left. \begin{matrix} 2.20 \\ 2.20 \\ 2.12 \end{matrix} \right\}$	2.17
Vegetable ivory, freshly ignited and am- moniated ... ..	$\left. \begin{matrix} 2. \\ 1.92 \\ 1.94 \end{matrix} \right\}$	1.95
Vegetable ivory, platinized (2 per cent.) ...	1.74	1.74
Vegetable ivory, freshly ignited, soaked in water ... ..	$\left. \begin{matrix} 1.36 \\ 1.32 \\ 1.24 \end{matrix} \right\}$	1.30
Vegetable ivory, freshly ignited, covered with a layer of water ... ..	$\left. \begin{matrix} 0.0 \\ 0.0 \end{matrix} \right\}$	0.0
Coquilla nut, freshly ignited ... ..	$\left. \begin{matrix} 2.0 \\ 1.94 \\ 2.4 \end{matrix} \right\}$	1.99
Cocoa-nut shell, freshly ignited ... ..	$\left. \begin{matrix} 2.0 \\ 1.98 \\ 1.92 \end{matrix} \right\}$	1.97
Acacia wood, freshly ignited ... ..	$\left. \begin{matrix} 1.80 \\ 1.88 \\ 1.94 \end{matrix} \right\}$	1.87
Peat, freshly ignited ... ..	$\left. \begin{matrix} 1.80 \\ 1.66 \\ 1.82 \end{matrix} \right\}$	1.76
Belloc's charcoal, freshly ignited ... ..	$\left. \begin{matrix} 1.82 \\ 1.80 \\ 1.70 \end{matrix} \right\}$	1.77
Belloc's charcoal as sold, without ignition...	$\left. \begin{matrix} .68 \\ .66 \\ .66 \end{matrix} \right\}$	.67

From this table the following deductions may be made :—Charcoal made from the most solid vegetable substances is greatly superior as a gas absorbent to that made from the lighter kinds, like Belloc's preparation ; and that made from vegetable ivory is the best.

The absorbent power of charcoal is slightly weakened by pulverization, is much impaired by exposure to the atmosphere and damp, or by soaking in water, and is altogether impeded by being covered with water.

Charcoal, to be effective against gastric flatulence, must be introduced amongst the gases of the stomach in the same state as when fresh from the crucible. The means for effecting this, enclosing it in gelatine capsules, so that it may be set free in the stomach by solution of the gelatine, has been already described.

It may also be inferred that, as the absorbent action is protracted and is not destroyed by being wetted, charcoal may still prove beneficial when it is passed into the intestines.

Charcoal, by virtue of its porous nature, takes up gases mechanically as a sponge takes up water. Its capacity in this respect is in proportion to the number and fineness of its pores. Charcoal made

from vegetable ivory or cocoa-nut shell is a compact, heavy substance, having a metallic lustre and ring, the pores being quite invisible.

This kind of charcoal, then, is best adapted to the present purpose. It should, in the first instance, be carefully prepared by sufficient ignition, and when about to be filled into the capsules should be powdered and re-ignited in a crucible. I have as yet no clinical experience of the ammoniated charcoal; but when the alkali is indicated it will probably be found the best. Charcoal impregnated with chloride of platina has been recommended as an absorbent by Dr. Stenhouse, but it did not answer my expectations.

An experiment conducted for me by Mr. Robins, to whom I am indebted for much valuable aid, shows how necessary it is that good unsaturated charcoal should be used.

An iron bottle, to which a long tube of the same material was adapted, was filled with twelve ounces of ordinary medicinal charcoal and placed on a strong fire. A glass tube tapered at the free end to a very small size, was adapted by means of india-rubber tubing to the free end of the iron tube. As soon as the charcoal ignited, gas began to issue from the glass tube and continued to do so

for about two hours. It could be lighted, showing the presence of carburetted and other inflammable gases. It is possible that the excess of gas was partly due to the charcoal not having been well made, and it certainly shows the necessity for caution in selecting the article for use.

Charcoal always contains oxygen, because, when taken from the crucible, it immediately obtains it from the atmosphere, and its affinity for nitrogen is much less. This easy separation of its component parts goes to prove the soundness of the opinion that the combination of oxygen and hydrogen in common air is purely mechanical.

Charcoal has a different point of saturation for every gas, but when filled with one or more it is still capable of absorbing other gases. Thus, coarse-grained charcoal saturated with ammonia takes up more carbonic acid than charcoal without ammonia; and the same charcoal when saturated with both takes up a larger quantity of sulphuretted hydrogen than of either. This is a valuable property where, as in the case of the intestinal cavity, the gases are various. Much is still to be learned about it; but the reason why charcoal saturated by ammonia takes up carbonic acid so freely, is plainly due to the formation of carbonate of amino-

nia. The impregnation of charcoal with oxygen has important therapeutic actions. It is this which renders it so valuable an agent in destroying the fetor of foul sores, and, when taken internally, of correcting any putrefactive tendencies; and it is also by virtue of this that sulphuretted hydrogen is not only absorbed but immediately decomposed.

The gelatine capsules employed are of two kinds—those ordinarily used for taking liquid medicines, and those made in separate portions which fit into each other; and in either case care is taken that they be hermetically sealed with gum or liquid gelatine as soon as filled. The limit of size for the capsules must, of course, be determined by the individual capability of swallowing them. The largest contained only five grains of the light charcoal at first used, and found so efficacious in the case mentioned, but the same sized capsule will contain more than ten grains of the heavy kind; thus a relative as well as an absolute advantage is gained, for the heavy charcoal possesses much higher absorbent powers.

Charcoal taken in large doses presents one great disadvantage: intestinal obstruction, as in the case of magnesia, has sometimes been the consequence. Now, the table proves that vegetable ivory char-

coal freshly ignited is three times more effective than Belloc's damp charcoal. But this superiority must be still greater in consequence of the mixing with water preparatory to Belloc's charcoal being swallowed; and if it sink in the fluids of the stomach, which, should any be present, it inevitably will do in consequence of the saturation, its efficacy will be altogether destroyed. But granting that charcoal taken in the ordinary way has a certain absorbent power, a very large dose will be required to equal the activity of a single capsule of the heavy charcoal.

It may be objected that, although charcoal be swallowed in hermetically-sealed capsules, it must necessarily undergo liquid saturation as soon as set free in the stomach. But charcoal, not being easily wetted, will float on the surface of its contents; and to test its capability of absorption when in this position I tried the following experiment:—

Into a receiver containing carbonic acid a little warm water was introduced; a capsule of heavy charcoal was then put into the receiver. The gelatine having been dissolved by the water, its contents were set free in about a minute, and the charcoal floated on the water. Absorption now proceeded actively.

The number of capsules to be taken must vary with the greater or less severity of the flatulence, but three or four will generally be found sufficient. It is not advisable to drink while swallowing them, but the process may be aided by eating a small piece of dry bread.

Twenty grains, or two capsules, of the vegetable ivory charcoal absorb more than two cubic inches of carbonic acid gas. If a greater effect be desired, and the dose be increased to four capsules, nearly five cubic inches will be taken up. Now, admitting that these effects are not quite so active in the stomach as they are in the experiments, there must still be absorption enough to give relief to the patient. The effect may at any time be tested and the repetition of the dose guided by percussion over the greater end of the stomach. More charcoal should be taken as long as the percussion sound is tympanitic.

Vegetable ivory charcoal in capsules has been already employed by a number of medical men, and I have received many reports of the results. With few exceptions these are very favourable, and in one case the charcoal seemed even to have removed the tendency to flatulence. The most marked cases of success will be found to be those

in which distension is such as to cause a temporary paralysis of the muscular fibres of the stomach. In these instances absorption of a portion of the gas is the cause of the expulsion of much more, as previously explained, and ordinary carminatives then give assistance. In some cases, however, carminatives alone are all that is requisite.

The beneficial action of charcoal need not be confined to the human subject. I have suggested its use in appropriately-sized capsules for flatulence in horses, and also as a remedy for that frequently fatal distension of the first stomach from carbonic acid which occurs in cows after certain food, such as clover and potatoes, and hope soon to hear of their successful application.

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